The Chemical Age

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Notes and Comments

The Institute in the Provinces

THE Institute of Chemistry took a sensible step when it inaugurated, two years ago, a conference of hon. secretaries of local sections for the interchange of opinions and experience regarding the work of the Institute in the provinces, as well as in London. It is easy to lose sight of the fact that the real success of such an institution depends upon the support it receives from chemists who are geographically out of touch with London headquarters, and this recognition of the value and usefulness of the work of the local officials has been welcomed throughout the ranks of the Institute. We are interested to learn from the latest issue of the "Journal and Proceedings" of the Institute that the third of these conferences has just been held in London, under the chairmanship of Dr. A. Coulthard, of the Manchester section.

From the brief account of the meeting we gather that the promotion of joint meetings with the local sections of other societies was warmly encouraged, and the conference urged the Institute to take steps to encourage the development of new industries in the depressed areas. It is often suggested that unemployment is created by the inventions of chemists and engineers, and this suggestion that chemists themselves should do something about it is a good one. The local officials compared notes in a preliminary way with regard to the syllabuses for the approaching session, and the importance of the general interchange of programmes was stressed. Regarding invitations received by members to give addresses on the services rendered by chemistry to the community before societies, such as Rotary Clubs, the conference found it difficult to generalise, but felt that members should welcome such opportunities of making known the work of the profession. The idea of the local officials getting together is excellent, and it is one that might be adopted with advantage by the other organisations which have branches scattered throughout the British Isles.

Italian Chemical Industry

THE synopsis of advances in the Italian chemical industry which we publish on another page will indicate the advances that have been made within recent years—advances that may be aptly summed up in the words of Dr. Massimo Treves: "Ten years of intense work have left their indelible traces and have brought Italy to the point where we can rely upon being furnished with the products required through our own resources. Previously we had to rely upon foreign production." Those words, written in 1933, set the seal upon yet another attempt to achieve economic nationalism. Again the system employed was to make use of the raw materials of the country to make either the genuine articles required or such substitutes as would be reasonably satisfactory. If Italy could harness the forces latent in Vesuvius to provide the power that is needed for the industrial processes of the country, that would be an achievement that might make her indeed economically self-supporting and would go far to raise her from an economic position that is now distinctly parlous. As it is, apart from some lignite, fuel is scarce in Italy and is mostly imported.

In fuel oil the situation is the same, and in order to reduce the dependence upon foreign petrol the attention of the Italian authorities has been directed to the production of alcohol for motor fuels; a plan has been devised to bring the production of power alcohol up to 20 per cent. of the present Italian petrol consumption within four years. Unfortunately the only source of power alcohol appears to be from sugar beet, although by-product methanol from the synthetic ammonia works is expanding. The difficulty is that in general, unless areas which could and should grow food are turned over to alcohol production, the only alcohol that can be made requires imported coal or coke in order to produce the necessary carbon.

Italy's Supply of Coal

IF Italy's supply of coal were to be cut off for any reason, the situation would be difficult. The Italians realise this and, since the country is not completely devoid of coal, are taking steps to put the Italian colliery industry on a sound national basis. The extent of the coal mines of Italy may be gauged from the fact that in 1934 the total production of bituminous coal in Italy was but 289,046 tons, and of anthracite 84,547 tons. In 1934 the production of lignite reached 408,656 tons. A recent issue of the Italian Official Gazette contained particulars of a new body to develop the national coal resources, known as the Azienda Carboni Italiani. This body will absorb the existing collieries and, in addition, will prospect for and exploit new deposits, finance technical and economic improvements, and trade in nationally produced coal, the State providing a yearly grant of 3,000,000 lire for the achievement of these various objects. The crux of the Italian industrial and chemical situation is thus the provision of fuel, and until that is settled it seems difficult for any industrial process requiring much fuel to be successfully established there except to supply a heavily protected home market.

Meanwhile, Italy, frantically indulging in a policy of economic nationalism—in chemicals as in other direc-

tions—finds her exports decreasing seriously and is disposed to blame Great Britain's protective policy for this. Figures recently published, however, show that this is not so and the decrease is primarily due to the actions of other countries. Between 1930 and 1934 Italian exports to all countries decreased by 57 per cent. and those to Britain individually by 55 per cent. Our imports from America and France have in the same period diminished by 70 per cent. Actually we take a slightly greater proportion of our total exports from Italy than we used to do (9 per cent. in 1930 to 10 per cent. now), while both France and Italy have appreciably reduced their imports from Italy. Undoubtedly Italy has gone as far as possible along the road to economic self-sufficiency in the chemical industry, and will probably solve her fuel problem in time.

Economical Nationalism

THE inception of new industries in Ireland and the difficulties in Germany, to which reference was made last week, as well as the chemical achievements in Italy which we have just discussed, have running through them the trend of economic nationalism that now afflicts the entire world. This was the subject of Professor J. G Smith's Presidential Address at the British Association meeting to the economic science and statistics section. It was pointed out that the principle was far from new and was an offshoot of " national exclusiveness " that is as old as human nature itself. Professor Smith puts the climax at 1931 from the events of that year " the existing highly developed system of barriers to international trade sprang, armed, as it were, overnight." The problem before the world, as has frequently been stressed in these columns, is to remove the international restrictions on trade. Professor Smith discusses how this could be done. The fundamental cause of all restrictions is held to be disparities in the price levels of the same commodities in different countries due to different degrees of currency depreciation and if progress is to be made this must be removed. Professor Smith holds that the stronger nations and Great Britain particularly should lead the world in currency stabilisation. " It is only by an international monetary standard of some kind, permitting of stability in foreign exchange rates, that the temporary excesses in the trend towards economic self-sufficiency could be cured and prosperity restored." The conclusion drawn is that this country—and others if possible—should now take the first steps to bring the world back to an international standard, which, Professor Smith concluded, should be based on gold, not necessarily because it is the best, but because " the world is not yet ready to abandon an international standard based on gold." The striking shrinkage in international trade, of the order of 50 to 70 per cent., since 1931, is the outstanding industrial fact of the present year of grace. Undoubtedly business men are only too keen to see the former conditions of trading return, but is the demand for the removal of these barriers as widespread as Professor Smith believes? Governments and people are once again becoming obsessed with the war germ and many an industry that has been established will be kept going if only for the reason that national safety demands self-sufficiency. Only an economist could adequately criticise Professor Smith's proposed cure, but we permit ourselves to wonder whether he has not omitted a factor of no small potency, the removal of which will be infinitely more difficult than monetary stabilisation, which in its turn was beyond the power of a World Economic Conference!

Chemical Production of Motor Spirit

THE pamphlet by Mr. F. Lindley Duffield, reviewed in our issue of September 7, directs attention to the increasing part that chemistry and the chemical industry is playing in the production of fuel. At one time fuel oils and motor spirits, other than petroleum, were produced wholly from coal by carbonisation. To-day the chemist requires the intervention of the carbonisation process only to produce his carbon in a convenient form. He then causes the carbon to react with steam by the well-known water gas process, and in that way with the addition of hydrogen he builds up a gaseous reaction mixture consisting of $CO + 2H_2$. If this be passed over a zinc-chromium catalyst at temperatures of the order of 300 to 400° C. and at a pressure of about 200 atmospheres, methyl alcohol is formed; if, on the other hand the gaseous mixture be passed over a metallic catalyst such as iron, nickel or cobalt which can form carbides, at a temperature of 200° C. and at atmospheric pressure, there is formed a mixture of non-alcoholic oils varying in character from the lightest hydrocarbons to solid waxes and paraffins.

The Duffield process involves nothing that is fundamentally new, but consists of the manufacture of methyl alcohol synthetically by known reactions; the low temperature carbonisation of coal to produce the coke required in the water gas reaction and also as high a yield as possible of heavy hydrocarbon gases which are subsequently dissolved in the alcohol to form a motor spirit of high calorific value. It is, in short, another form of butane gas, which is distributed and, as announced in our issue of September 14, in England also, in cylinders in the United States, for domestic use. No doubt the volatile matter left in the coke will yield the hydrogen necessary to convert the water gas ($CO + H_2$) into the correct composition for the methanol reaction ($CO + 2H_2$). The Duffield pamphlet wraps the proposed process in a deal of mystery, but this description appears to be the essence of it. It will clearly be necessary to investigate the economics of the process when technical perfection has been approached. There is, however, nothing inherently impossible in the technical claims made, though the cost of production strikes one as being optimistic. It is a directly chemical process and, as such, might well prove of interest to the chemical industry, particularly since that industry has engaged in the much greater experiment of hydrogenation. Unquestionably we must agree with Mr. Duffield when he sets out to make motor spirit at a cost less than that of the C.I.F. price of imported petrol. Unless that cost can be approached, the home production of motor spirit will be economically impossible, save as a temporary and panic measure based upon considerations of national defence. There is one point to be borne in mind by those chemists who are encouraged to investigate this question. How long will light spirit be needed either for road transport or for aviation? There are undoubted signs that the reign of the violently inflammable and dangerous light spirit is ending and that the internal combustion engine of the future will use only heavier oil that will not take fire upon the least excuse.

Cooling Water in Industrial Plant

By John D. Watson

APART from the duty of cooling condensing water at industrial power plant, using one or more comparatively large cooling towers or a spray pond system, there often arise instances where it is necessary to cool the water from internal combustion engines, refrigeration plant and that used in a variety of " coolers " in the milk industry, and in food processing, brewing, distilling, oil refining, etc. To do so is usually worth while as it saves the loss of turning such water to waste, if it is otherwise useless.

There are two principal methods of cooling water: either a small cooling tower or vacuum cooling may be adopted. Cooling towers for this particular duty, whilst functioning on the same general principle as those connected with condensing plant, are rather different in construction. Where there are relatively large volumes to be dealt with, probably the best proposition is the louvre type of cooling tower (Fig. 1). This is quite a compact arrangement which can be conveniently placed on a flat roof or on the top of a water tower. Constructional details are indicated in Fig. 2. The warm water is distributed by the bakelite or copper nozzles (A) and thence falls upon aluminium or copper splash plates (B) within the head casing (C). The main masts (D) have the floor carriers (E) bolted to them, and also the triangular louvre carriers (F). The latter have supporting rods (G), louvre strengthening battens (H) and a finishing rail (J). These natural draft towers will function in quite light winds, though obviously the degree to which a given volume of water can be cooled depends upon the wind velocity to a large extent, in addition to the relative humidity also being an important factor.

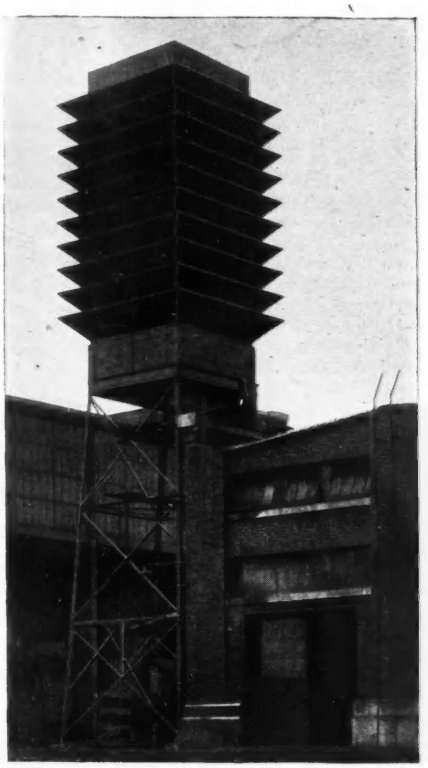

Fig. 1. — A typical small Louvre Cooling Tower

Rather more compact is a composite steel and wood construction, having heavy strongly-braced uprights of copper-bearing steel angles. Louvre retainer channels are welded to the upright posts to permit the insertion of the louvres without the use of any nails, bolts or screws. With the louvres made of 1-in. California redwood and all the metal parts first coated with bitumastic asphalt, and then with two coats of aluminium paint, this construction has a fair measure of durability, though obviously a non-ferrous construction is to be recommended as the conditions are about the worst imaginable for inducing corrosion. Unless the tower is mounted over a concrete tank it will have to include a metal or wood lead-lined collecting pan. At the top there is a spray nozzle manifolding equipped with the requisite number of nozzles, for preference of the form shown in Fig. 3, although this arrangement and the general layout is

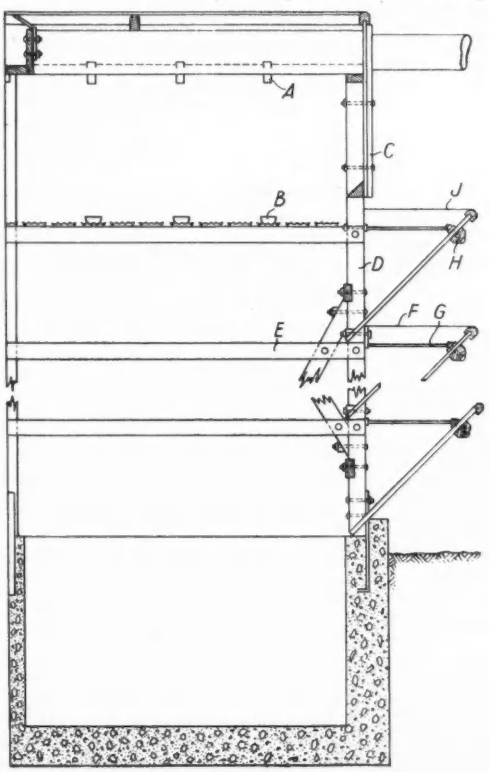

Fig. 2 (left). Constructional details of the Louvre Cooling Tower.

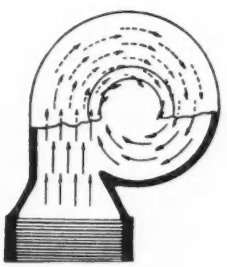

Fig. 3 (above). Spray Nozzle Manifolding.

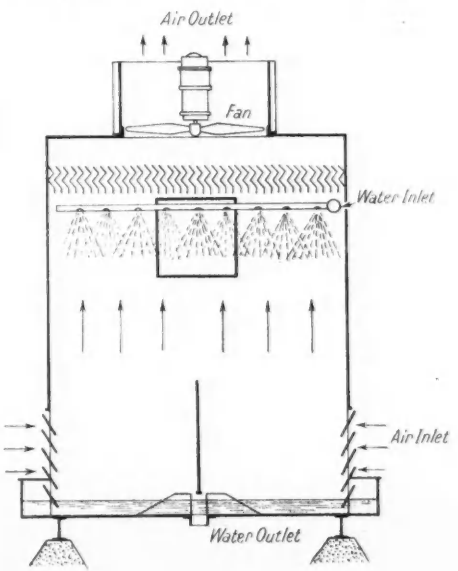

Fig. 4 (right). Details of Induced Draught Cooler.

much the same as the rather more adaptable induced draft type (Fig. 4).

In common with large cooling towers, the most economical arrangement is usually one where the tower is sufficiently large and exposed as to be able to operate under all conditions of atmosphere and load without any fan to create a draft, but one placed either indoors or outdoors and equipped with a fan has the advantage of being compact and effecting perhaps a certain saving in the pumping costs to the credit of the fan motor. Whilst there may be various arrangements, one takes the form of what is little more than a galvanised iron box with a water spray arrangement at the top, a shallow water sump at the base and a trunking just above this, connecting to a horizontal shaft fan with possibly the water circulating pump as part of the equipment as a whole. All this can function quite well, and if placed indoors it is only necessary to connect the outlet air trunk to a passage leading outside the building, but for the best results the arrangement shown in Fig. 4 is to be recommended. Here, while the principle is just the same as that of the forced draft tower, the air is drawn through by a vertical shaft fan in place of being forced in.

By reason of the fact that this cooling of water by atmospheric means depends to a large extent upon the degree of water break-up in the tower and the air velocity through it, the better control which can be effected by induced draft is a strong point in its favour. Here there is no "filling," as usually associated with cooling towers of large capacity: the nozzles, of the form already indicated, spray downwards through the upwardly rising air current and any moisture carried up beyond them is trapped by the zig-zag grid arrangement placed above the manifold.

Vacuum Cooling

The vacuum cooling system (Fig. 5) functions on a wholly different principle. Combining a steam jet air pump, a thermo-compressor and a condenser, this equipment can cool water or produce cold water cheaply with only two small

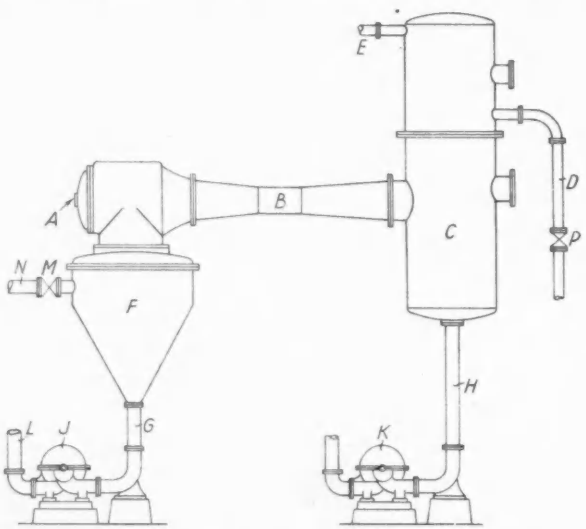

Fig. 5.—Diagrammatic Arrangement of Vacuum Cooling System. A. Steam Inlet. B. Thermo-compressor. C. Condenser. D. Condenser Water Supply. E. Connection to Steam Jet Vacuum Pump. F. Flash Chamber. G. Cold Water Tail Pipe. H. Condensing Water Tail Pipe. J. Cold Water Removal Pump. K. Condensing Water Removal Pump. L. Cold Water Discharge. M. Warm Water Control Valve. N. Warm Water Return. P. Condensing Water Control Valve.

centrifugal pumps as the moving parts. One of these provides the condenser with cooling water, if that is not available from any other source, and the other removes the cooled water from the flash chamber. The energy for the cooling is derived from the steam used in the thermo-compressor which is discharged into the condenser. Its purpose is to compress the vapour from the pressure in the flash chamber to that prevailing in the condenser, thus making it possible to condense the vapour with the circulating water available.

The only requirement, other than motive power for the pumps, is steam at moderate pressure for the thermo-compressor. A production of the Foster Wheeler Co., the compactness of the equipment will be at once apparent from Fig. 6, which depicts the application of the principle to the cooling of drinking water in a large factory. Other applications, such as providing cold water for air conditioning, milk cooling and removing the heat of fermentation in yeast vats will be readily apparent. The advantages claimed for the system are that the medium being cooled is its own refrigerant, so that cooling coils and noxious or costly fluids are

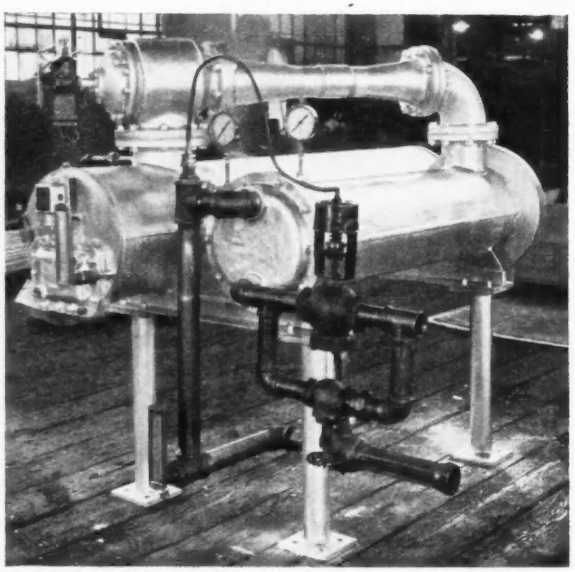

Fig. 6.—Cooling Water by Vacuum: Foster-Wheeler System.

eliminated. Furthermore, if there is a demand for process heat this can be provided by the plant because it acts as a heat pump and can make available for other purposes heat removed from the cooled water by raising the temperature head of this heat in the compression of the vapours by the thermo-compressor.

Whilst the theory of the vacuum cooling system is somewhat involved, there is really no mystery about it all. That water can be cooled by evaporating a portion of it is a well-known principle. It is, in fact, the basis of both cooling towers and spray systems. Under vacuum, the cooling can be carried to an appreciably lower point, and, whilst attempts have been often made to reach quite low temperatures by this method they have not proved a commercial proposition. The arrangement shown, however, principally by virtue of its scientifically designed steam jet and thermo-compressor, has proved very successful and, when water has to be cooled a stage further than is possible with a cooling tower, it is to be recommended.

In the operation of this vacuum cooling system, the water to be cooled is piped into the chamber (F) in which a high vacuum is maintained. The water being warm and the vacuum high results in an absolute pressure which causes the water to boil and evaporates a portion of it. The vapour liberated from the body of water absorbs latent heat of evaporation which is received from the heat of the liquid introduced into the flash chamber. It is this abstraction of heat which cools the remaining water to a temperature corresponding to the absolute pressure in chamber (F).

Assuming one pound of water at 55° F. entering (F), where the absolute pressure is 0.3 in. mercury (29.7. in. vacuum referred to a 30-in barometer), if x is the fraction of water vapourised, the latent heat of vaporisation is 1,066 B.Th.U. per pound, and as saturated steam at 0.3 in. mercury has a temperature of 45° F. this will also be the temperature of the water in the flash chamber. Assuming the specific heat of water to be equal to 1 the heat given up by the water will be (55-45) B.Th.U. per pound. Then, as the heat absorbed by evaporation is $1066x$, $1066x = 55.45$, and therefore $x = 0.00938$. Thus a little more than 1 per cent.

of the water introduced will flash into vapour and thereby cool the remainder of the water 10° to a final temperature of 45°. F.

In order to maintain the absolute pressure of 0.3 in. mercury, it is, of course, necessary to remove the water vapour as fast as it is formed, and this is taken by the thermo-compressor (B) into the condenser (C) in which a vacuum is maintained by the pump connected to (E), water being supplied via (D) under the control of the valve at (P) and drawn off via pipe (H) by the removal pump (K).

The specific volume of one pound of water vapour at an absolute pressure of 0.3 in. mercury is 2,033 cubic feet, so that the volume of vapour to be removed from the chamber (F) is 0.00938 .× 2,033, or 19.1 cubic feet. Therefore, under these assumptions, a pound of water introduced into this chamber will be cooled (as stated) to 45° F., leaving 0.9907 lb. available in the liquid state at this temperature. The available amount of cooling resulting from the flashing of one pound of water is 0.9907(55-45), or 9.907 B.Th.U. The volume of vapour to be removed for each heat unit is thus equal to 19.1/9.907, or 1.928 cu. ft. It will thus be seen that the volume of water vapour to be removed in an average-sized plant may be anything up to 20,000 cu. ft. per minute, which calls for a thermo-compressor of large capacity and of rather special design.

In practice it is usual to increase the pressure of the vapours to such a point that, at the exit therefrom, they will have a condensing temperature somewhat higher than that of the available water supply. The reason for this is because, in common with all compressor equipment, the lower the ratio of compression the smaller the amount of steam necessary to do the work. The condensation of the vapours is thereby made possible in any ordinary type of condenser as that shown at (C), leaving only the non-condensible vapours resulting from air leakage or solution to be handled to atmospheric pressure by a small steam jet air pump connected to (E). Other parts of the equipment, including the pumps (J) and (K), are made clear by the diagram.

The British Association Meeting, 1935

Some Reflections by Professor H. E. Armstrong

AGAIN the British Association has come, has been seen but has in no way conquered, having but followed the self-satisfied, if not selfish, course of which there has too long been loud complaint. That the physician cannot heal himself is fairly clear. The Association shows no real interest in public welfare; it has no desire to uplift the public level of intelligence, no desire to discuss, in any significant way, the issues of immediate concern to the nation; it gives no indication that it can read the writing on the wall, brought about by the far too one-sided application to our affairs of the fruits of scientific inquiry. In fact, it has served its purpose: unless it can be mended without further delay it should be ended.

It is difficult to believe that the appointment of a "scientific outsider" as president is to be taken as a sign of repentance: he is not put into office to act as a Lloyd George, in knocking our heads together and forcing us to work together with considered care to public ends, to sweep out the Augean stable of our academic conceit. Nor can the choice be taken as the sign of a desire on the part of the body scientific to associate with commerce and affairs, so that it may be rationalised: it it be, not a little may be said for the departure. Rationalisation is supposed to involve concentration of management in the hands of a limited, competent executive. The Association has long been without any effective, sympathetic control: therefore, without proper management. The council has always been a ragged body, without a policy, run by the official clique, which has no real responsibility cast upon it. The sections have been allowed each to paddle its own little canoe up any small stream it may care to explore, never operating as a fleet to some definite end. The Association, in fact, has been typically English in its individualism: this has been both its strength and its weakness. It has well served its purpose in the past but it has long since outworn its original purpose. To-day, the call is for combined action. In fact, the Association but mirrors the schools in its blind devotion to professionalism. The teaching of Science so-called in the schools has been all but a complete failure—because it has been professional and in single subjects: it is now being realised that chemistry, physics, etc., must no longer be taught as such separately but a general training given in natural knowledge which may serve to awaken the scientific spirit and also inculcate some broad understanding of and interest in the world we live in and the life we lead—making us rational and reasoning beings, in so far as this may be possible, as we are innately irrational animals. In the same way the Association needs rolling up, if not into a single body, at least into a small number of representative, interlocked, responsible sections—so that it may no longer be a mere variety show, run largely for the sake of individual advertisement and personal glory.

The management of a great railway company cannot be a simple task—Sir Josiah Stamp must be a bold man indeed to add to his multifarious obligations that of a reformer of our ultra-individualistic body-scientific. Either this or nothing—if he merely fall into step and deliver the conventional address, full of the usual platitudes, he will have done no good: he will merely carry deception a stage further. Unless he boldly denounce our so-called association and show how it may be made an effective machine, to serve general, not private, ends, he will not help us. When, as a member of the Wine and Food Society, I note the low grade of catering in the dining cars on railways I am not hopeful. I am still less hopeful when I think how nothing has been done by railway managers to relieve us from the varied abominations of the railway refreshment rooms of which Huxley bitterly complained in 1870, when a candidate for the first school board. On the other hand, I am uplifted by the beauty of the posters displayed by Sir Josiah's publicity department: if he be inspired by these to issue a special series for Blackpool, guiding the Association into swings and roundabouts that may really give us joy, make merry Audreys of us all, he will be both benefactor and a guide and companion to men, as was once the Waverley pen. I can fancy him embodying the things to be really thought about—no mere atoms, ions, electrons, *p*H's or other scientific futilities but real public issues, particular belly service—in a series of graphic posters and expounding these in his presidential address. This is strictly "copyright reserved": I shall demand a big fee when the idea is carried into execution. Meanwhile, I should welcome a retainer to help with more detailed suggestions. I will now offer one on credit. Sir Josiah's scientific lieutenant, Sir Harold Hartley, I believe, has softened the water supplies throughout the L.M.S. system: a marvellous act of chemical aftersight. Suppose he were to extend the use of soft water from engine boilers to refreshment rooms and trained the superior young women who reign over them to make tea and coffee that were not merely fit to drink but actually enjoyable and attractive: I will say nothing of reconstituting the sausage and bath-bun at their pre-war values. Suppose, too, that travellers were invited and attracted to drink milk that was milk—not like our London skim. If Sir Josiah, at the same time, gave bread that was bread and could dilate at Blackpool upon these things as done, those travelling to his support by his lines, having witnessed them in amazement and let us assume with scientific understanding: he would suffer nothing short of transfiguration and his reputation be made for all time. What is the use of our boasted knowledge, of carrying on academic research, if we continue to travel by rail in the dull and unassisted way we do, unable to obtain palatable, nutritious food. Seeing the inferiority of the food supply upon our roads, the poor devil of a motorist who takes a glass occasionally, a mug of the smallest of beer—as great a disgrace almost as our milk supply in its entire lack of quality—may be excused his occasional lapse; if he kill himself, as a consequence—probably an impossibility—he suffers but a happy release. If travelling upon the railways offered attractions such as I portray the call of the road might be lessened to the profit of the rail. Geology is entirely

neglected in our schools. The L.M.S.R. and the S.R. have done great service by their posters—geology may easily be taught from the railway platform. If a geological map were affixed to each railway car, some interest might be taken in our wonderful country as we pass through it.

The L.M.S.R. publicity men have shown fine appreciation of the female figure at the sea side. They should be able to herald Sir Josiah's advent at Southport by costume posters which would aid members to dress or undress themselves appropriately. With the materials he commands, the new president should be able to treat the meeting in an entirely original and attractive manner.

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Enough of the future. What of to-day. The only address delivered at Norwich in the least degree of public importance was that appropriately given in L by the president, Dr. A. W. Pickard-Cambridge, Vice-Chancellor of the University of Sheffield, on Education and Freedom. The idea of "freedom" being preached in such a resort is startling—it is unknown out of it to-day, impossible even in Heaven. No one of us can think except within the limits of his ignorance—"freedom of thought" is a mere figure of speech: what anyone thinks or thinks he thinks, as a rule, depends upon what some other fellow has thought before him and impressed upon him. To think at all is very difficult: few can. This is the crux of education. The main object of the teacher should be to train the pupil to exercise judgment, be judicial: to consider the evidence in proof of statements made; especially the art of using knowledge to advance in knowledge. Such teaching being in direct opposition to the method of the churches, to all authority, is necessarily discouraged on all hands—not only by fascist rulers. Every obstacle to the upgrowth of complete sanity of outlook is put in the way of upgrowing intelligence. Then, as Dr. Pickard-Cambridge points out, the party politician comes in finally to rule the roost. Our schools to day are as little short of fascist control as are those of some foreign peoples. Neither are the teachers free to teach nor the pupils to learn.

Dr. Pickard-Cambridge had done the greatest possible service to the community in voicing the abhorrence not a few of us with experience of education have against the present commercialised system of school examinations, controlled nominally by the Universities, actually by a small body of professional men, operating a business organisation for profit, with no special educational qualification nor any rational outlook upon the world. The degrading influence of the system upon the intelligence of the nation has long been only too obvious to those of us who have studied the subject in detail. It is intolerable that it should be supported by our Ministry of Education—that such massacre of our infants should be possible.

To quote a few of the weighty words that come from Norwich:

"I had better say explicitly that I rank examinations, not in themselves but as they are treated in most schools, at the present time, among the worst enemies to education in freedom of thought and independence of judgment. Examinations can be and should be invaluable aids to education, but it is a condition of this that they should be only an incident in the work of the school, testing at convenient points the work of both teachers and pupils and really, not merely by profession, following and not directing the curriculum . . . where the whole work of the school is planned to cover or lead up to the syllabus of some particular examination; where every subject is studied at a rush, in order to work into the pupils' minds what are virtually prescribed answers to questions which may almost be said to be prescribed—so narrow is the range from which they can be drawn; where the teacher does not dare to encourage his pupils to think; where he cannot go at his own pace and cover in his own way the ground which he can effectively cover, for fear of the effect on the statistics by which the local education authority, knowing little of education, judges the efficiency of his school and his own fitness for promotion or by which the employer, knowing even less, judges the suitability of individuals for purposes never contemplated by the examination authorities—there examinations are a very mischievous thing. . . . It would take too long to-day to enter upon a discussion of the remedies, which might in fact involve a very large reconstruction of our whole educational system. The thing most essential is to distinguish examinations as an aid to education from examinations as a test of fitness for purposes external to the school. As it is, the attempt to combine the two aims has had a sufficiently long trial and has proved a most unhappy failure. The external purpose has virtually eclipsed the internal. I should certainly not abolish examinations, even external examinations—which may be of great use to a school if they are based on the actual and freely arranged work of the school; but there should be no issue of certificates of any kind nor any publication of results beyond the school itself . . . unless the habit of working and teaching for examinations before everything else is abjured, I see little hope of the type of education which alone can save democracy and bring up a race of free men and women."

Brave and warning words these, coming as they do from one who is himself a repentant sinner, in high authority over his University, from a city of steel—perhaps the last place from which such profession of faith was to be expected.

Every voice at the Association should have been uplifted in support of this prayer for our future freedom. That the president and his followers could only send forward a protest against noise is proof how little they have understood their office and its opportunities or read the signs of the times. Well may "The Times" have criticised the Association and suggested its reconstruction.

Indian Chemical Notes

Cement Manufacture in Mysore

THE Mysore Government proposes to start a cement manufacturing factory. Expert opinion from Bombay and Copenhagen has stated that suitable raw material is available in Mysore, and cement could be manufactured at competitive rates. The slag available at Bhadravati will be sufficient for a plant of 18,000 tons capacity, and Mysore itself consumes 12,000 tons. There is also a decided freight advantage. Assuming 52s. 6d. per ton as the lowest possible limit at which imported cement could be sold in Mysore, this would still leave a margin of 4s. 6d. to 6s. for Mysore cement. A ten per cent. return is expected and Bhadravati is suggested as the most suitable place for the proposed factory.

Study of Plant Chemistry

THE importance of the study of plant chemistry in India was stressed by Dr. S. N. Chakravarty, of Annanalai University, in a lecture delivered to the Chemistry Society of the University. There was the problem, he said, before India, of producing adequate quantities of quinine at a sufficiently cheap rate. India produces annually only about 70,000 lb. of quinine, while her actual requirements have been estimated to be in the neighbourhood of 1,000,000 lb. per year. The chemistry of not a single plant has been fully worked out in India. The task of settling the constitution of the active principle of a plant, of a new alkaloid, or a complex new glucoside or a sterol, required chemical skill of the highest order. These investigations might prove of immense value. Already hydroquinone and quinidine are remarkably superior to quinine in anti-malarial properties, although they differ only slightly from quinine in structure. Dr. Chakravarty pleaded for the starting of such investigations in India.

Travancore Paper Factory

THE prospects of a paper pulp factory in Travancore are being investigated by the State and it is understood that about 50 tons of a special kind of reeds have been sent by the State Government to the laboratory of the Titaghur paper mills in Bengal for investigation as to their quality and use in paper pulp manufacture. A survey carried out in the forest areas between Pallivasal and Neriamangalam which have recently become accessible since the opening of a road there have shown that "catta" reeds could easily be extracted in an area of about 28 square miles which would yield annually about 12,000 tons of air-dry "catta." It is thought that Alwaye would be an ideal place for the location of a paper pulp factory, as it has a railway station and is also in the vicinity of the Cochin harbour. Labour is cheap and there is an abundant supply of fresh water. As regards power, the completion of the Pallivasal hydro-electric scheme in the near future will make cheap electric power available for the working of the factory. It has not yet been decided whether the paper mill will be a State enterprise or a private enterprise aided by the State.

Progress in Bleaching, Dyeing and Finishing

Fully Used Tinctorial Value in Two-Colour Printing

IN printing patterns on cotton and artificial silk fabrics by means of vat and Rapidogen (Rapid Fast) dyes using sulphoxylate formaldehyde compounds for the purpose of fixing the vat dye, it is found that volatile sulphur by-products are formed, and these retard development of the Rapidogen dyes so that a considerable proportion of their tinctorial value is lost. Recently a method has been devised (Eng. Pat. 427,900) whereby this difficulty has been avoided. According to this new method the vat dye is reduced, so that it can be fixed, by means of an alkaline mixture of ferrous sulphate with a comparatively small proportion of stannous chloride. There is thus no possibility of adverse effect on the Rapidogen dye.

Cotton fabric is first printed with the following two-colour paste (applied from separate rollers) for Rapid Fast and vat dye patterns:—

(1)	Rapid Fast Red GL paste	10 parts.
	Water	27 ,,
	Wheat starch—gum tragacanth thickening ...	60 ,,
	Sodium salt of meta-nitrobenzene sulphonic acid	3 ,,
(2)	Caledon Jade Green X paste	10 parts.
	British gum thickening	60 ,,
	Water	21 ,,
	Ferrous sulphate	4 ,,
	Stannous chloride 50% solution	1 ,,
	Tartaric acid	4 ,,

The fabric is then dried and aged in steam containing acetic acid vapour for 2 to 4 minutes at 100° C. Following this, the fabric is padded with

Caustic soda of 90 Tw.	1,720 parts.
Indian corn starch	80 ,,
Alkaline gum	200 ,,
Perminal MERC (penetrating agent)	40 ,,

Again the fabric is dried, and then steamed for 2 to 5 minutes at 100° to 102° C., whereupon the caustic soda acts with the ferrous sulphate as a reducing agent towards the vat dye so that this is fixed in the fabric. The fabric is then well washed with cold water, oxidised in a 0.2 per cent. solution of sodium bichromate, again washed, and finally soaped at the boil to make the vat colour faster and brighter. In this manner there is produced, side by side, red and green patterns, the tinctorial value of both types of dye being fully used.

Dyeing Fast Shades on Cotton

It is most unfortunate that the faster direct cotton dyes are usually either of good fastness to light and poor fastness to washing or vice-versa; it is seldom that a direct dye has good fastness to both light and washing. For at the present time many manufacturers of woven and knitted goods desire to avoid the use of the costly fast vat dyes in their efforts to produce cheaper goods, and will gladly use direct dyes if the fastness of these are satisfactory. It is, therefore, useful to note that quite recently a range of fast direct dyes has been extended which are capable of taking the place of vat dyes in many instances where fast colours are required.

The Benzo Fast Copper dyes, as this recently extended range of fast dyes is known, was introduced about six years ago by I. G. Farbenindustrie and details of the various members are now described by K. Ottenschlager ("Textilber.," 1935, *16*, 283). Six members of the series are now available—Benzo Fast Copper Yellow RL, Brown 3GL, Red RL, Violet 3RL, Violet BBL, and Blue GL. They are all easily soluble and have a maximum substantivity at 85° to 90° C. on cotton. Although of reasonable fastness when applied in the ordinary manner, it is by a simple treatment with about 2 per cent. of copper sulphate and 1 per cent. of acetic acid at 80° to 85° C. for 20 minutes that their maximum fastness is developed. After this treatment, the dyeings are not only fast to light and washing but they stand up well against perspiration, rubbing, and seawater. Owing to their content of copper they protect the dyed fabric against mildew and bacterial attack; the dyes are thus very suitable for application to bathing costume fabrics and fishing nets. It would seem that in this range of Benzo Fast Copper dyes the dyer has to hand the most satisfactory alternative to vat dyes.

In preparing cotton fabric for bleaching and subsequent dyeing it is customary to boil it in rope form within a kier for 8 to 12 hours with a 1 to 2 per cent. solution of caustic soda since this treatment has the effect of removing most of the pectic, waxy, and starchy impurities. Bleachers who control this process have offered to them from time to time numerous proprietary products reputed to assist the purification of the cotton when added (in small quantities) to the kier liquor. Owing to the conditions of kiering being capable of such wide variation, it is often difficult to decide whether or not these recommended assistants do actually act in the beneficial manner claimed for them. Thus it is useful to refer to a paper by F. Scholefield and D. Ward ("J. Soc. Dyers and Col.," 1935, *51*, 172) which describes the results obtained in a careful investigation of the effect of adding Lissapol A (Imperial Chemical Industries) and rosin soap to kier liquors.

In these investigations a small experimental kier of about 45 gallons capacity was employed, and before kiering, the cotton fabric was singed and desized (with an enzyme preparation) as it might be in large-scale practice. A 1 per cent. solution of caustic soda was used as a kier liquor. The kiered fabric was examined, both before and after a subsequent bleaching with a hypochlorite solution, with respect to its whiteness, absorbency, wax and fat content, copper number, and tensile strength.

An addition of 0.2 per cent. of Lissapol A (calculated on the volume of kier liquor) was found to be the optimum concentration. The kiered fabric was then found to be whiter than usual although this advantage was largely lost by the subsequent bleaching. Removal of natural fats and waxes from the fabric was also assisted by the presence of Lissapol A in the kier liquor, this being evident from chloroform extractions of the kiered and bleached fabric. From copper number and tensile strength determinations it was concluded that the cotton fabric was not deteriorated any more than when Lissapol A was omitted from the kier liquor.

For many years it has been the practice of bleachers to add rosin soap to the kier liquor. Scholefield and Ward find that there are good grounds for making this addition. Although the whiteness of the fabric immediately after kiering is not so good with rosin soap as with Lissapol A yet this difference is much reduced when the fabric is afterwards bleached with a hypochlorite solution. Also from the data given with regard to chloroform extracts of the kiered fabric it seems that rosin soap is more effective than Lissapol A in assisting the removal of fats and waxes. A disadvantage of rosin soap is that it is not easily washed out from the fabric so that there is a tendency for soap residues to be left.

Investigations indicate that Lissapol A definitely favourably influences kiering, but the bleacher will obviously require to decide whether this benefit can be obtained at reasonable cost. It may be noted that a kier may contain 500 gallons of liquor and for this an addition of 25 lb. of Lissapol A would be required, but how much do the benefits obtained from the use of Lissapol offset this additional cost?

Printing with Vat Dyes

In printing cotton fabric with vat dyes it is usual to apply a printing paste containing the vat dye together with caustic soda and a formaldehyde sulphoxylate compound and then steam the fabric at 100° C. for the reduction and fixation of the dye. But in dyeing with vat dyes it is seldom that the dye liquor is maintained above 60° C. and for many dyes a considerably lower temperature is recommended. Vat dyes are partly destroyed by reduction at too high a temperature.

Recently an attempt has been made (Eng. Pat. 421,279) to modify the construction of the usual steaming chamber for fixing vat printed fabrics so that the most satisfactory temperature gradients within it can be obtained. In the front of the chamber are disposed electrically heated units which are thermostatically controlled whereby the incoming fabric is raised only to 70° to 80° C. which is sufficient to reduce the vat dyes in the printed parts. After this the remainder of the chamber is maintained at a lower temperature and at a suitable degree of humidity so that the subsequent fixation of the vat dye on the cotton can take place without decomposition of the dye.

The Italian Chemical Industry

WRITING in "Chemical Markets" of January, 1933, on chemical production in his country, Dr. Massimo Treves said that in Italy, as in all other industrial countries of Europe and America, the explosives industry was passing through a particularly grave period and the plants of this industry had been equipped in the most modern technical manner. An index of development was given by the production of sulphuric acid which had risen by over one million quintals in the last ten years. In 1932 the Italian factories producing mineral superphosphates had a capacity considerably in excess of the maximum needs of the country. Regarding nitrogen fertilisers the "Montecatini" group was producing annually 48,725 tons of synthetic nitrogen. Bearing in mind the factories for the production of nitrogen cyanamide and minor producers of synthetic nitrogen and of by-product nitrogen from the gasholders, we had the realisation of the tremendous organisation of the national fertiliser industry which had been able to supply to Italian consumers the materials they need without having recourse to foreign importation. Dr. Treves sums up his report by saying: "Ten years of intense work have left their indelible traces and have brought Italy to the point where we can rely upon being furnished with the products required through our own resources. Previously we had to rely upon foreign production." In view of this statement it is interesting to examine the still further enormous developments which took place during 1934, the figures for which are now available.

Research Developments and New Products

According to "Commerce Reports," the Montecatini Company, during 1934, constructed and inaugurated two large research laboratories, one for organic chemistry at Cesano Maderno and one for inorganic chemistry at Novara. These two laboratories are on a scale hitherto unknown in Italy. They employ almost 100 chemists and technical experts, include research laboratories, semi-industrial testing departments, libraries and conference rooms, and are equipped with the most modern and complete instruments and apparatus. Between these two laboratories all fields of modern chemistry are covered. Like all other branches of industry, the chemical industry sought to consolidate its position along lines already successfully proven. Expansions took place in nitrogen fixation and in the production of its derivatives, in the field of coal-tar derivatives, in the developments of domestic sources for motor fuels, in the production of helium and other natural gases, in the increase in natural supplies of cellulose, and in the production of miscellaneous industrial chemical products. During 1934 domestic production of high concentrate nitric acid obtained by direct synthesis and of such nitrogenous fertilisers as calcium nitrate, synthetic sodium nitrate, pure ammonium nitrate, and the biammonium phosphate was greatly increased.

The Montecatini Concern

The Montecatini chemical concern reports important advances in its production of synthetic dyes and medicinals, methanol, formaldehyde, urea and synthetic resins, artificial cryolite and synthetic camphor. The company further stated that it had obtained a satisfactory synthetic petrol from domestic lignite, and had developed an important new explosive derived from methanol and nitric acid. It has solved the problem of producing a domestic cellulose suitable for nitration and for the rayon industry. With regard to cellulose for paper manufacture, Italian chemists have successfully perfected a chlorination process for obtaining cellulose from annual plants. The Catiere Burgo is already operating a plant utilising rice straw, while the Cellulosa Cloro Soda, of Naples, plans to erect shortly a plant at Foggia, utilising wheat-straw, which will have an annual capacity of 15,000 tons of cellulose.

At Larderello the Societa Boracifera has made further progress in the separation of the gases from the natural steam geysers and, in addition to the carbon dioxide, extracts also hydrogen, nitrogen, methane and small quantities of helium. Among the authorisations to erect new plants granted by the Ministry of Corporations during 1934 a number of permits were issued for the chemical industry. Of special interest were the authorisations given the Azogeno and the Societa

"Ten Years of Intense Work"

Nazionale Chimica, a subsidiary of the Montecatini and since absorbed by the latter, to erect plants for the production of hydrocyanic acid and its salts. These products have not heretofore been manufactured in Italy, domestic consumption being covered by imports of sodium cyanide from Germany and calcium cyanide from the United States. Ministerial decrees authorised new plants and expansions in the fields of intermediates and dyes, nitric acid and nitrogeneous fertilisers, phosphoric acid, sodium and potassium peroxide, ethylene bromide and tetra-ethyl lead.

Alcohol for Motor Fuel

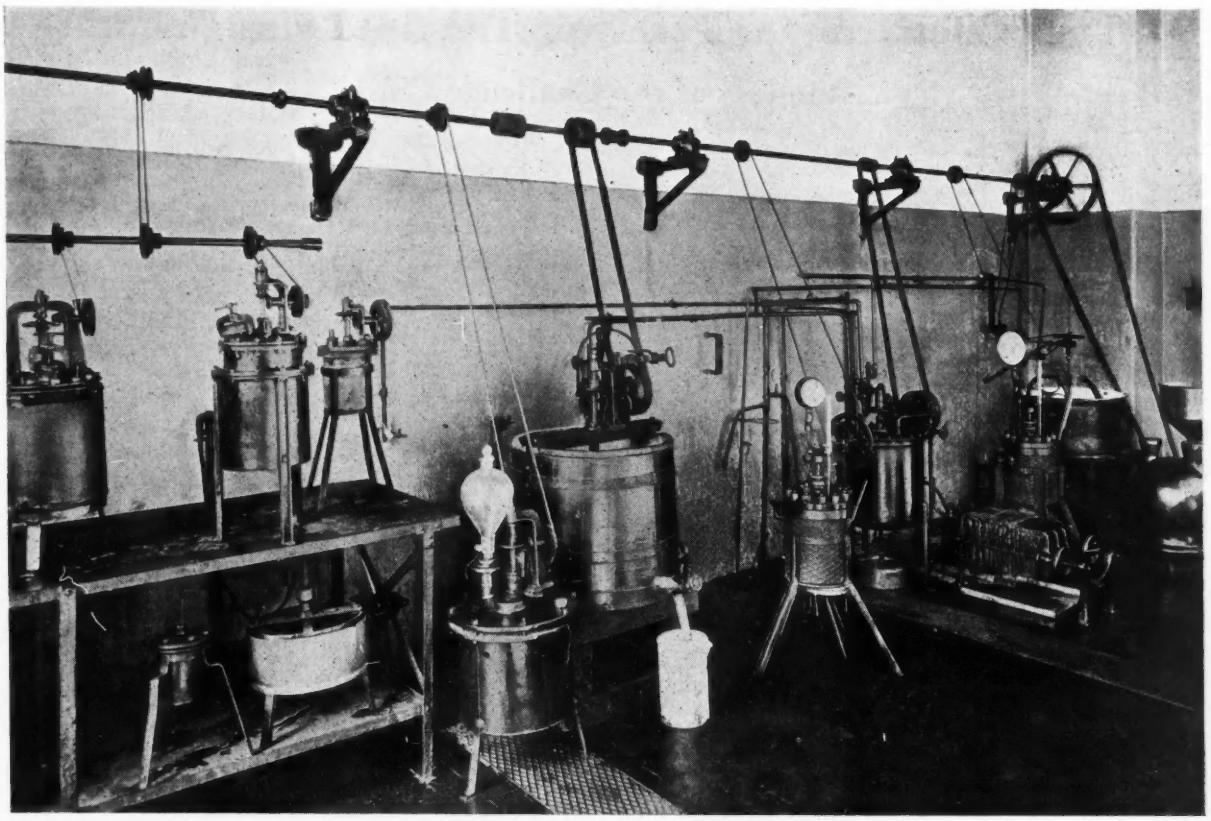
In an effort to reduce the country's dependence on foreign supplies of petrol in the event of a national emergency, the attention of the Italian authorities has been turned to national facilities for the production of alcohol for motor fuels. In 1930 an Act was passed obliging alcohol distillers to put 25 per cent. of their output at the disposal of distributors of motor fuels at a fixed price below the current market price of alcohol.

A plan has recently been announced for bringing production of alcohol for motor fuels up to 1,000,000 hectolitres within four years, representing 20 per cent. of the present Italian petrol consumption. The contemplation would be: 1935, 150,000 hectolitres; 1936, 500,000; 1937, 800,000; 1938, 1,000,000. An output of 1,000,000 hectolitres of alcohol will require a 50 per cent. increase in the present sugar beet acreage. Arrangements have already been made for a 5 per cent. increase during the current year. The three principal producers of synthetic ammonia are reported to have further expanded their productive capacity of co-product methanol. The Terni has developed the Casale methanol process, and its plant has now a normal daily capacity of 30 tons of methanol, which can be doubled in case of need.

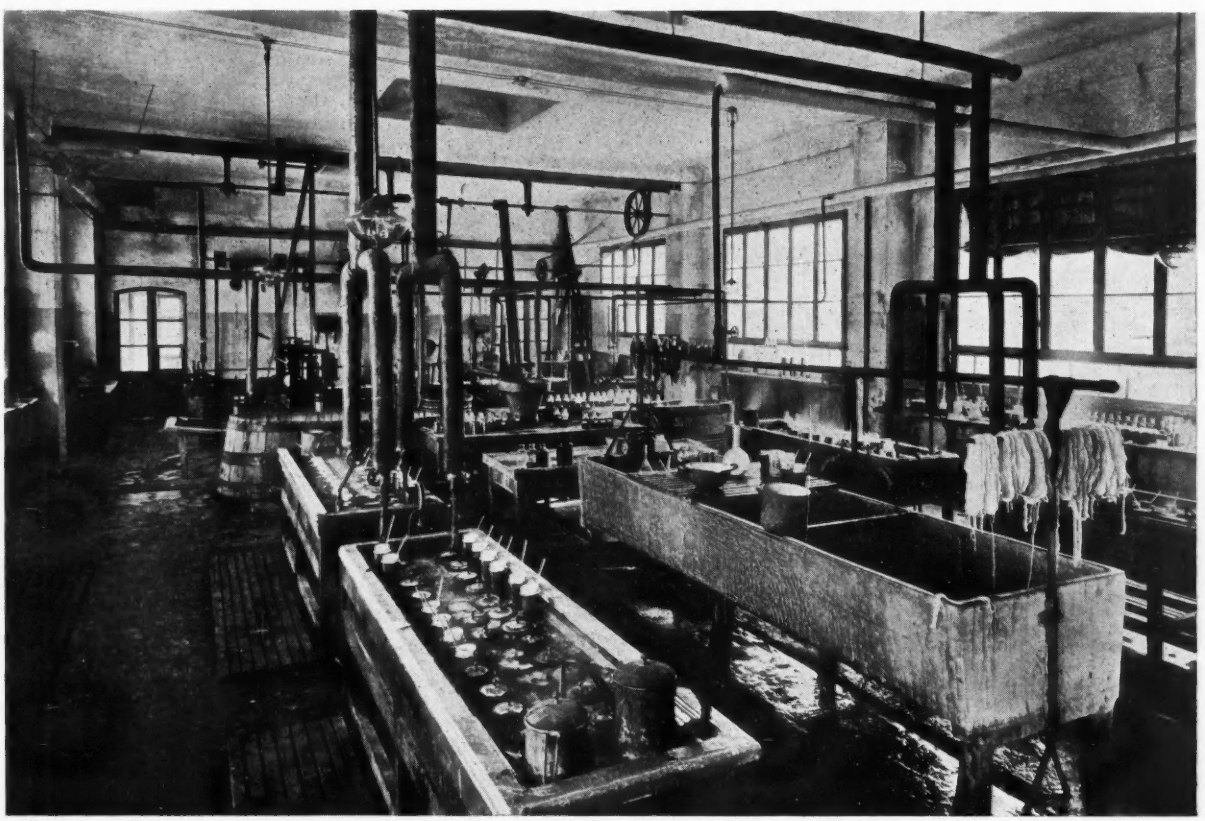
Chemical Fertilisers

Although production of superphosphates increased in 1934 to 1,082,538 tons as compared with 1,003,298 tons in 1933 and 666,607 tons in 1932, the 1934 consumption was somewhat below that of 1933. In spite of the fact that superphosphate prices as fixed by the Ministry of Agriculture were reduced 6 per cent. at the beginning of the current agricultural year, the use of superphosphates by Italian farmers has continued to decline during the spring of 1935. The Ministry of Agriculture recently issued a circular to the farmers pointing out the danger of allowing the phosphate reserves of the soil to fall below a normal content. In contrast to phosphate fertilisers, both production and consumption of nitrogenous fertilisers continued in 1934 the upward curve which has mounted steadily in the past four years.

In the year 1934, 18,277 tons of synthetic sodium nitrate of domestic manufacture were consumed, as compared with 13,714 tons in 1933. Up to the present, the synthetic sodium nitrate has been produced only in the Meran and Crotone plants of the Montecatini, but the Terni has also important plants under construction for the production of pure ammonium nitrate, calcium nitrate and sodium nitrate. The Montecatini has also begun building operations on a new nitrogen-fixation plant at S. Giuseppe al Cairo, near Savona, which, when completed, will have an immediate annual capacity of 14,000 tons of nitrogen, which can easily be doubled in case of necessity. The hydrogen in the new plant will be derived from coke-oven gas and the nitrogen will be fixed in the form of pure ammonium nitrate and calcium nitrate. These two fertilisers are assuming growing importance in Italy, and, with the completion of the Terni plants, will be manufactured by all three of the big producers. The Montecatini has also enlarged the Crotone plant for the production of biammonium phosphate. The Montecatini is about ready to make urea at Novara. Although no figures are available on the capacity of existing plants of the three principal nitrogen fixation companies for the direct production of synthetic nitric acid, it is known that all three are steadily adding to their nitric-acid units.



Semi-industrial Scale Plant, Organic Chemistry Research Laboratory.



Equipment for Testing the Tinctorial Values of Modern Dyestuffs.

These photographs are reproduced by permission of the Montecatini concern, represented in London for chemicals and sulphur by Mr. Joseph Weil.

The Chemical Age Lawn Tennis Tournament

Winners of the Challenge Cups

THE fifth annual CHEMICAL AGE Lawn Tennis Tournament came to a successful conclusion on September 14, when an enjoyable afternoon was spent at the sports ground of Johnson, Matthey and Co., Ltd., at The Toll Gate, College Road, Dulwich. At the close of a season which has been remarkable for the number of matches postponed on account of the weather, an enthusiastic audience witnessed an excellent match in which F. G. Hawley and J. Haines, of the Anglo-Iranian Oil Co., Ltd., succeeded in winning the doubles for the third year in succession, their opponents this year being A. E. Willshere and L. F. Grape, of Borax Consolidated, Ltd. The singles tournament came to a disappointing end through one of the finalists, R. N. B. D. Bruce, of the Gas Light and Coke Co., meeting with an injury to his hand a few days before the day appointed for the match. His doctor forbade him to play, and the honours therefore went to his opponent, J. Haines, of the Anglo-Iranian Oil Co., Ltd., who was no less disappointed than Bruce at having to forego the final contest.

The tournament was inaugurated in 1931, but in the first two seasons it was confined to men's doubles. The singles contest was introduced in 1933, and in each of the three years since it commenced one of the singles finalists has also played in the doubles final. In 1933 R. C. Pennington lost both singles and doubles; in 1934 A. Baxter lost the doubles and won the singles; and this year J. Haines won the doubles and secured a walk-over in the singles.

Well Matched Pair

Last Saturday's contest was the second held through the kindness of Johnson, Matthey and Co., Ltd., at their delightful Dulwich rendezvous, and, but for a heavy shower which delayed the start of the match for three-quarters of an hour, the weather was favourable, though rather windy, and some capital play was witnessed, the match running to three sets with the score 4-6, 6-3, 6-3 in favour of Hawley and Haines. Having established a 2-1 lead in the first set, Willshere and Grape took the next two games, losing only one point in each, but Hawley and Haines brought the score to 2-4 with a love game. The seventh game ran to deuce three times before Willshere and Grape took it; the ninth was a similar struggle, ending in favour of Hawley and Haines, who won the eighth easily at the expense of one point and lost the tenth with only two points in their favour.

The second set opened with two games to Willshere and Grape, but the next five went to Hawley and Haines, and after conceding one further game Hawley and Haines won fairly easily at 6-3. In the third set Willshere and Grape repeated their promising opening by leading 2-0 before Hawley and Haines took a love game. Four further games went in favour of the winners, one of which reached deuce five times. Willshere and Grape then gained a game at the expense of a single point, but Hawley and Haines proved the better pair and took the last game.

The Finalists' Records

The records of the finalists in this year's tournament were as follows:

Hawley and Haines.—First round, walk-over (P. E. Dearman and L. J. Seabrook, British Oxygen Co., Ltd., scratched); second round, beat R. E. Porter and R. S. Law, Howards and Sons, Ltd., 6-1, 6-3; third round, walk-over (R. N. B. D. Bruce and E. H. M. Badger, Gas Light and Coke Co., scratched); semi-final, beat F. R. O. Allen and R. A. J. Bennett, Nobel Chemical Finishes, Ltd., 6-1, 4-6, 6-0.

Willshere and Grape.—First round, beat J. S. Wilson and A. Tickner, British Celanese, Ltd., 6-2, 6-4; second round, beat D. G. Blow and V. G. Cripps, British Drug Houses, Ltd., 6-2, 6-1; third round, beat C. G. Copp and R. D. Hayman, Doulton and Co., Ltd., 6-2, 7-5; semi-final, beat V. J. Prosser and A. Baxter, John Haig, Ltd., 6-2, 2-6, 6-3.

J. Haines (who secured a walk-over in the singles final).—First round, beat R. J. Sleap, United Yeast Co., Ltd., 6-0, 6-3; second round, beat A. S. Marcar, Bovril, Ltd., 6-2, 6-3; third round, beat A. Tickner, British Celanese, Ltd., 6-2, 6-3; semi-final, beat F. G. Hawley, Anglo-Iranian Oil Co., Ltd., 5-7, 6-2, 7-5.

R. N. B. D. Bruce.—First round, beat R. A. J. Bennett, Nobel Chemical Finishes, Ltd., 6-2, 6-3; second round, beat L. Maronge, Bakelite, Ltd., 6-0, 6-1; third round, beat A. C. Collins, Sparklets, Ltd., 6-3, 6-3; semi-final beat L. F. Grape, Borax Consolidated, Ltd., 2-6, 7-5, 6-3.

Mr. J. Shaw, of Johnson, Matthey and Co., Ltd., kindly officiated as umpire, and the match was played with balls of the official L.T.A. standard supplied by T. H. Prosser and Sons, Ltd., Holloway.

When it became known that Bruce would be unable to play in the final, an exhibition match was arranged between J. Haines and L. F. Grape (who was defeated by Bruce in the semi-final), but owing to the lateness of the start occasioned by the afternoon's rain the match was abandoned.

At the close of play the players and guests were entertained to a sumptuous tea and then came the presentation of the trophies, comprising THE CHEMICAL AGE silver challenge cups for the winners of the doubles and the singles (to be held jointly by the winners and their firms for twelve months), "Invicta" statuettes given by Thomas Hill-Jones, Ltd., presented outright to the winners, and "Lloyd Willey" statuettes, given by Mr. W. Lloyd Willey, for the runners up. The company at the presentations included Mr. E. Glanvill Benn, a director of Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, accompanied by Mrs. Benn, who charmingly made the presentations, Mr. George Matthey, a director of Johnson, Matthey and Co., Ltd., Mr. Donald McDonald, Mr., Mrs. and Miss Lloyd Willey, Mr. H. Talbot, Mr. P. Reiss, manager of THE CHEMICAL AGE, and Mr. A. C. Cross, editor of THE CHEMICAL AGE, who organised the tournament.

Winners Hand back the Cup

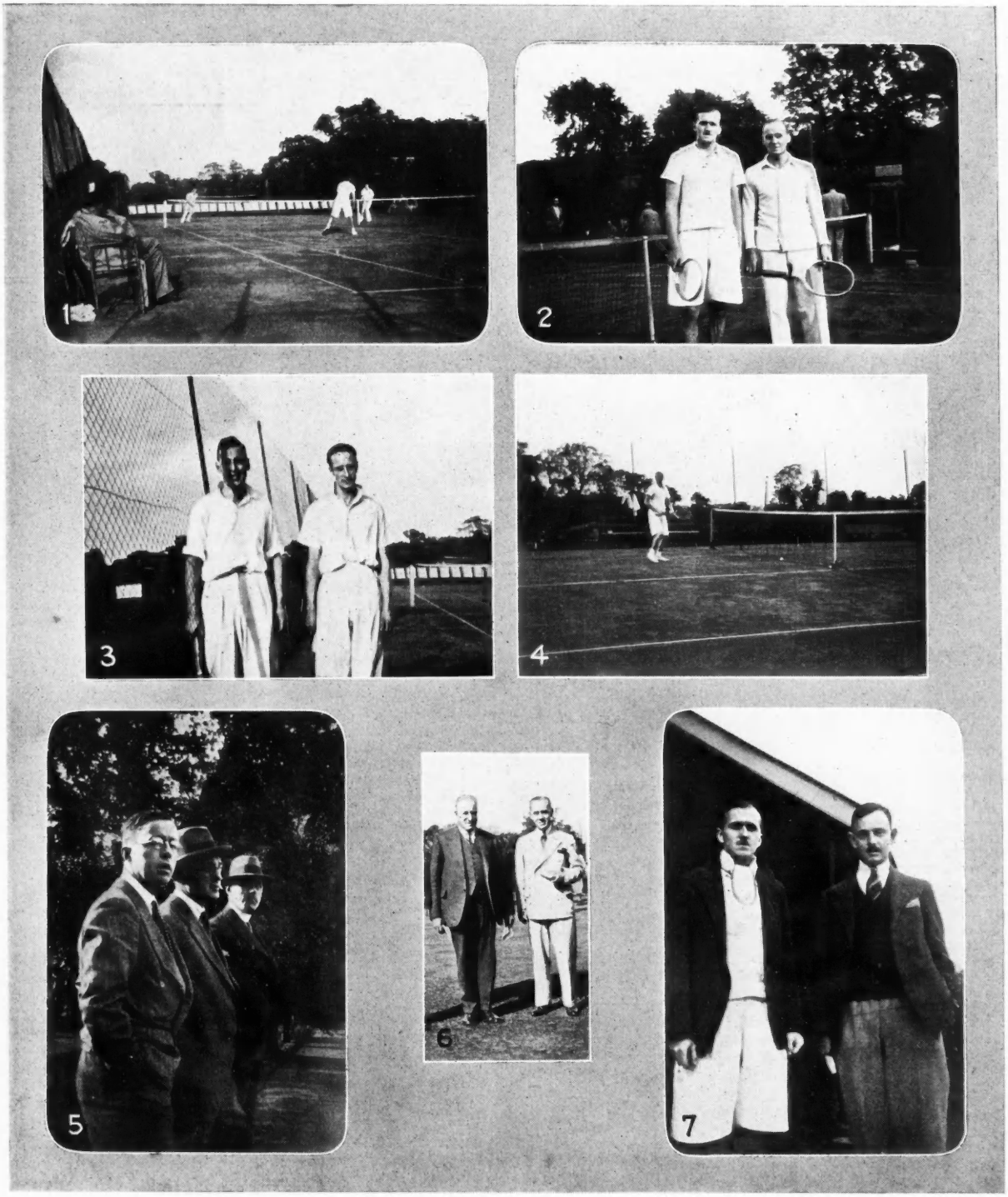
Mr. GLANVILL BENN congratulated the players upon the excellent match the visitors had witnessed and said that when the tournament was inaugurated in 1931 no one anticipated the possibility of THE CHEMICAL AGE doubles cup being won by the same pair three years in succession, and no reference was therefore made in the rules as to what should happen to the trophy in such circumstance. Hawley and Haines had done so extremely well that they richly deserved to have the cup outright. He was pleased to announce, however, that they had given it back to the organisers of the tournament in order that it might long continue to be the object of friendly rivalry amongst tennis players throughout the chemical industry. He sympathised with Bruce in having to forego the pleasure of playing in the singles final. He had injured his hand whilst engaged upon laboratory work, necessitating a number of stitches which had been removed only a short time before the match. Mr. Benn expressed hearty thanks to Johnson, Matthey and Co., Ltd., for placing their grounds at the disposal of the tournament and for their hospitality in entertaining the visitors to tea. He also thanked Thomas Hill-Jones, Ltd., and Mr. Lloyd Willey for their gifts of statuettes, and mentioned that this was the third year they had given the trophies. Thanks were accorded to Mr. Shaw for acting as umpire, and to the ground staff for preparing the court and grounds.

After Mrs. Benn had presented the trophies, Mr. DONALD MCDONALD replied on behalf of Johnson, Matthey and Co., Ltd., and Mr. LLOYD WILLEY, in acknowledging thanks for this year's trophies, said he and his firm would be pleased to present similar awards for the lawn tennis tournament again next year.

Mr. F. G. HAWLEY thanked THE CHEMICAL AGE for organising the tournament, and Mr. A. C. CROSS, editor, replied on behalf of the staff and himself.

CAUSTIC soda imports into Netherland India are supplied chiefly by the United States, United Kingdom and Japan, entries from these countries during 1934 being, respectively, 3,044, 3,191 and 3,258 metric tons. Shipments from Netherlands, Germany and Russia were small, total imports being 9,896 metric tons as compared with 8,653 during 1933. Heretofore this has been an important item in the chemical trade with the United States, but imports from Japan are steadily increasing.

Some Chemical Age Snapshots at Dulwich



1.—The start of the doubles final. 2.—J. Haines and F. G. Hawley (Anglo-Iranian Oil Co., Ltd.), winners for the third year in succession. 3.—A. E. Willshere and L. F. Grape (Borax) Consolidated, Ltd.) the runners-up. 4.—"Where did that one go?" 5.—Mr. Glanvill Benn, Mr. H. Talbot and Mr. Donald McDonald watching the play. 6.—Mr. Lloyd Willey, donor of the statuettes, with the organiser. 7.—J. Haines with R. M. B. D. Bruce (Gas Light and Coke Co.), whose injured finger deprived him of the opportunity of participating in the singles final.

British Overseas Chemical Trade in August

Decrease in Exports

ACCORDING to the Board of Trade returns for the month ended August 31, exports of chemicals, drugs, dyes, and colours were valued at £1,507,189, as compared with £1,618,421 for August, 1934, a decrease of £111,232. Imports were valued at £1,005,741, as compared with £919,936; re-exports were valued at £40,968.

Imports

	Quantities. August 31, 1934.	Quantities. August 31, 1935.	Value. August 31 1934. £	Value. August 31 1935. £
Acids—				
Acetic .. .. cwt.	12,738	11,751	20,843	17,507
Boric (boracic) .. ,,	2,200	2,820	2,075	2,839
Citric .. .. ,,	3,370	1,165	9,023	4,620
Tartaric .. ,,	2,533	2,886	10,796	12,208
All other sorts .. value	—	—	7,100	9,235
Borax .. .. cwt.	6,736	18,601	3,337	9,053
Calcium carbide .. ,,	90,038	120,757	46,929	60,895
Phosphorus .. ,,	2,528	1,975	8,015	6,381
Potassium compounds—				
Caustic and lyes cwt.	9,855	11,110	12,014	13,040
Chloride muriate ,,	135,620	138,020	41,036	45,188
Kainite and other mineral potassium fertiliser salts .. cwt.	85,297	63,480	14,845	12,653
Nitrate (saltpetre) ,,	9,720	5,262	7,104	4,105
Sulphate .. ,,	130,100	63,062	43,119	24,691
All other compounds ,,	9,479	7,968	17,562	13,786
Sodium compounds—				
Carbonate, including crystals, ash and bicarbonate .. cwt.	27,071	3,451	8,023	1,386
Chromate and bichromate .. .. cwt.	12,497	2,291	16,657	3,328
Cyanide .. ,,	997	1,502	2,805	3,477
Nitrate .. .. ,,	2,176	60,317	571	11,978
All other compounds ,,	13,430	22,669	10,151	18,137
Other chemical manufactures .. .. value	—	—	184,035	273,616
Drugs, medicines, etc.—				
Quinine and quinine salts oz.	44,238	79,199	3,699	5,851
Medicinal oils .. cwt.	2,363	2,913	6,065	19,258
Ointments etc. cwt. ..	1	11	77	647
Proprietary medicines	—	—	35,307	39,013
All other sorts, manufactured or prepared ..	—	—	37,165	43,102
Bark Cinchona (bark Peruvian, etc.) cwt.	753	1,466	2,603	9,160
All other sorts, raw or simply prepared value	—	—	43,448	35,244
Dyes and dyestuffs and extracts for tanning—				
Finished dyestuffs (coal tar) .. .. cwt.	3,565	3,668	91,748	100,190
Extracts for dyeing ,,	2,193	5,210	4,755	11,133
Chestnut extract ,,	31,636	20,204	22,100	13,483
Quebracho extract ,,	44,981	25,722	27,873	17,359
All other extracts for tanning .. cwt.	56,729	26,756	38,000	18,797
All other dyes and dyestuffs .. .. cwt.	994	848	26,516	16,932
Painters' colours and materials—				
White lead (basic carbonate) .. cwt	6,664	7,512	7,819	8,982
Lithopone .. ,,	21,657	20,018	14,236	13,346
Ochres and earth colours cwt.	32,685	28,426	11,808	10,486
Bronze powders ,,	1,319	1,724	9,119	11,650
Carbon blacks .. ,,	22,031	35,582	34,931	51,748
Other pigments and extenders, dry .. cwt.	25,163	25,141	7,487	8,172
All other descriptions ,,	16,016	11,698	29,140	23,065
Total .. .. value	—	—	919,936	1,005,741

Exports

	Quantities. August 31, 1934.	Quantities. August 31, 1935.	Value. August 31 1934. £	Value. August 31 1935. £
Acids—				
Citric .. .. cwt.	3,430	3,355	11,300	14,018
All other sorts .. value	—	—	20,168	19,773
Aluminium compounds tons	7,979	2,565	87,882	22,249
Ammonium compounds—				
Sulphate .. tons	30,931	22,381	180,002	129,722
All other sorts .. ,,	837	1,045	12,669	13,448
Bleaching powder (chloride of lime) .. cwt.	41,130	59,680	11,085	15,866
Coal tar products—				
Cresylic acid .. gal.	105,263	131,400	9,013	11,689
Tar oil, creosote oil, anthracene oil, etc. gal.	1,801,257	1,100,635	34,976	32,440
All other sorts .. value	—	—	9,171	15,220
Copper, sulphate of tons	776	799	11,148	11,053
Disinfectants, insecticides, etc. .. .. cwt.	34,971	27,875	82,140	57,648
Glycerine .. .. ,,	11,629	13,813	25,618	32,174
Lead compounds .. ,,	12,135	13,776	14,927	16,258
Magnesium compounds tons	398	330	9,355	8,433
Potassium compounds cwt.	4,996	7,371	10,314	11,185
Salt (sodium chloride) tons	22,101	27,231	55,010	65,589
Sodium compounds—				
Carbonate, including crystals, ash and bicarbonate .. cwt.	283,838	306,286	77,784	73,182
Caustic .. .. ,,	163,356	163,450	95,771	85,434
Nitrate .. .. ,,	14,850	11,022	5,453	3,700
Sulphate, including salt-cake .. .. cwt.	63,641	100,026	6,433	7,795
All other sorts .. ,,	53,186	68,600	65,308	82,887
Zinc oxide .. .. tons	1,076	974	19,841	17,267
All other descriptions	—	—	193,430	186,978
Drugs, medicines, etc.—				
Quinine and quinine salts oz.	90,550	136,103	10,325	15,216
Proprietary medicines	—	—	91,196	80,787
All other descriptions	—	—	125,181	134,401
Dyes and dyestuffs and extracts for tanning—				
Alizarine, alizarine red and indigo (synthetic) cwt.	1,269	1,863	7,198	9,637
Other finished dyestuffs (coal tar) .. cwt.	5,936	5,213	69,384	71,880
All other descriptions cwt.	15,615	15,797	19,952	21,208
Painters' colours and materials—				
Ochres and earth colours cwt.	13,320	14,787	12,563	14,915
Other pigments and extenders, dry .. cwt.	15,015	29,331	19,173	28,515
White lead .. ,,	5,383	4,830	10,210	9,183
Paints and painters' enamels prepared cwt.	40,738	38,853	10,4475	97,361
Varnish and lacquer gal.	91,773	68,266	36,157	25,938
All other descriptions cwt.	30,637	33,566	61,809	64,140
Total .. .. value	—	—	1,618,421	1,507,189

Re-Exports

	Quantities. August 31, 1934.	Quantities. August 31, 1935.	Value. August 31 1934. £	Value. August 31 1935. £
Chemical manufactures and products	—	—	12,975	17,190
Drugs, medicines, etc.—				
Manufactured or prepared	—	—	9,373	10,272
Raw or simply prepared	—	—	7,947	8,289
Dyes and dyestuffs and extracts for tanning cwt.	596	404	1,761	2,901
Painters' colours and materials .. .. cwt.	630	805	935	2,316
Total .. .. value	—	—	32,991	40,96

The Shipping and Engineering Exhibition

Some Chemical Plant Exhibits

THE Shipping, Machinery and Engineering Exhibition was opened on Thursday, September 12, by Lord Sempill, and will remain open for a fortnight until September 28. There was an increase of 20 per cent. over the number of exhibitors at the last exhibition. More than 350 firms are represented, sixty of them for the first time. The exhibits are acquiring more and more of an international reputation as inquiries have been received from 85 countries, and more engineers from abroad than ever before signified their intention of visiting England for the show. For the first time in its history the exhibition contains a Foundry Trades Section. The exhibition was visited on September 19 by the Institution of Chemical Engineers and by the British Chemical Plant Manufacturers' Association on September 20.

Alfa Laval Co., Ltd., are exhibiting several types of the well-known De Laval centrifugal separators and clarifiers which are extensively used in all industries for the separation of immiscible liquids, the purification of lubricating and the clarifying of liquids. The applications upon which very great progress has recently been made include the treatment of Diesel engine fuel and lubricating oils, turbine lubricating oil, test lubricating oil, oil refining, treatment of tars and by-products, clarification of varnishes, enamels and paints, animal oils, fish oils and vegetable oils, starch and yeast, viscose and cellulose acetate.

Fire Extinguishing Appliances

Antifyre, Ltd., are exhibiting four of their latest portable fire extinguishing appliances, including the Antifyre alert model soda acid extinguisher. In this appliance the company has evolved an extinguisher which is completely free from creeping and bubbling. Further, they have succeeded in designing an extinguisher in which the acid charge is completely neutralised, thus entirely avoiding acid damage.

Babcock and Wilcox, Ltd., are displaying a full size Babcock and Wilcox marine water tube boiler with Erith-Roe stoker. A furnace of Bailey water-cooled construction is also being shown on this exhibit as well as a representative selection of oil burners and other examples of equipment all connected with steam-raising purposes.

Bell's Asbestos and Engineering Supplies, Ltd., are demonstrating a number of products of exceptional interest. Of a special interest are their products for use in connection with the dangers of fire applied to both fire prevention and to the protection from fire of human life and property, their "Bestobell" fireproof drop curtains and ceiling materials being perhaps of special note, since with them any outbreak of fire can be localised with certainty and the safe exit of persons in the fire zone ensured.

The British Oxygen Co., Ltd., are exhibiting oxy-acetylene welding and hand-cutting equipment for metal working. Oxygen, acetylene and other common and rare gases for commercial purposes form another feature on this stand.

Oil Purifying and Separating

British Separators, Ltd., are demonstrating a comprehensive range of the well-known "Vickcen" purifiers and separators. Items of particular interest on this stand are entirely new models which are being shown for the first time. They embody a number of entirely new features based on the wide and varied experience which the company has had both in marine and industrial applications. Varied forms of the machine will be shown for different applications. "Vickcen" separators are widely used by many leading industrial concerns for the reclamation of used motor lubricating oils; the clarification and dehydration of fish, vegetable, insulating and mineral oils; removal of solid suspensions from varnish, and selective clarification of enamels; also the clarification or removal of solid suspensions from liquids of many other types, and the separation of immiscible liquids.

The Cape Asbestos Co., Ltd., are displaying a full range of blue asbestos for heat insulation, which is claimed to be the most durable and efficient medium known for high temperatures.

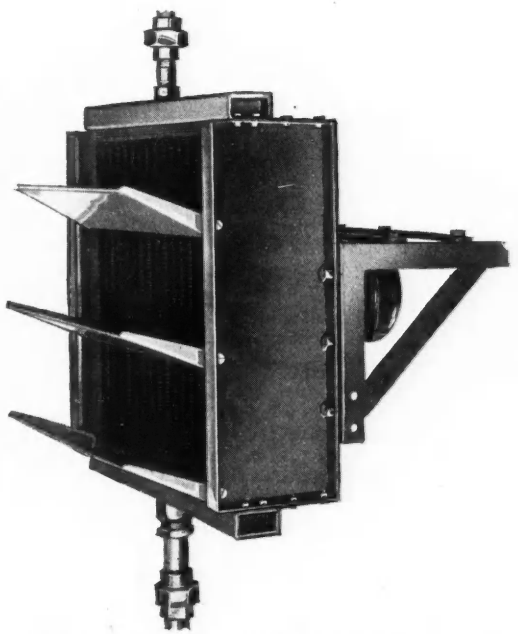
Chance Brothers and Co., Ltd., manufacture "glass silk" for heat and sound insulation. This material is an extremely good non-conductor of heat, in addition to that it has powers of endurance against vibration, moisture and local damage, which places it ahead of any other insulation.

Clensol, Ltd., are showing "Clensol" and "Noricene" descaling solutions which are used for the removal of scale from all types of marine, industrial and domestic plant.

The principal exhibits of Davey, Paxman and Co. (Colchester), Ltd., consist of a range of high speed Paxman-Ricardo Diesel engines.

Grant and West, Ltd., are exhibiting "Selek" metal to metal jointing material in powder form, which in practice forms a non-oxidising, non-rusting joint.

Hick, Hargreaves and Co., Ltd., are displaying a steam turbine for industrial purposes; an auxiliary steam turbine for driving pumps, generators, etc., and compressors.



The "Spiral Tube" Unit Heater, designed to suspend by swivel unions or hanging straps.

High Duty Alloys, Ltd., manufacturers of the "Hiduminium" R.R. series of high tensile aluminium alloys, are showing examples of their materials in the form of castings, forgings, stampings, tube, sheet, bar and extruded sections.

Hilmor, Ltd., are demonstrating a variety of machines to undertake the bending of every class of tube. The display deals with the bending of tubes on large and small radii and includes a quantity of sample bends.

Hopkinsons, Ltd., exhibit a comprehensive selection of boiler mountings and valves for all pressures and temperatures.

Kelvin, Bottomley and Baird, Ltd., are displaying specialities from their extensive range of scientific apparatus, including paint testing apparatus for comparing rate of change of colour and loss of hiding or protective power of paints, etc.

George Kent, Ltd., exhibit a comprehensive range of metering and control apparatus, foremost among which is the K.M. type flow recording meter. This type of meter operates in conjunction with either an orifice plate inserted in the main or a Venturi tube and is suitable for water, steam or any other fluid whatever the quantity or pressure. The meter is shown in its latest form and by comparison with previous models it is claimed that the weight has been reduced considerably and all parts made more accessible and more foolproof.

Richard Klinger, Ltd., are showing their well-known Klingerit high pressure steam jointing as well as their Klinger Oilit jointing for oil joints at highest pressures and temperatures. Various types of liquid indicators are also being shown at this stand, including their well-known reflex level indicators, and their latest pattern mica-protected double-plate gauge.

Siebe, Gorman and Co., Ltd., are displaying safety appliances, including "Proto" and "Salvus" self-contained oxygen breathing apparatus, "Spirelmo" smoke helmets of various patterns, "Novox" (oxygen CO_2) and "Novit" (oxygen) resuscitating apparatus, "Puretha" gas masks of all patterns, and "Pulvasorb," "Lane," and other types of dust and spray masks. Asbestos and other protective clothing (fire, oil, and waterproof), and industrial safety gloves and goggles for all purposes are other features.

Reavell and Co., Ltd., are demonstrating a representative selection of the compressors and exhausters which they manufacture for dealing with air or gases.

The Spiral Tube and Components Co., Ltd., are exhibiting their unit and plenum type air heaters. The "spiral tube" unit heater is of all-welded construction and is designed to suspend either by swivel unions or by hanging straps, but can be supplied for wall fixing if desired.

Super-Centrifugal Engineers, Ltd., are showing several types and sizes of the well-known Sharples super-centrifugal separators and clarifiers, and additionally the Sharples self-discharging horizontal bulk centrifuge.

C. C. Vokes, Ltd., are showing filtration for every industry, including filters for the prevention of silicosis, comprising filters for silica flour, sand blast plant and other applications requiring the reclaiming of dangerous or valuable dust.

James Walker and Co., Ltd., are exhibiting an extensive range of packings and jointings for all pressures and temperatures of steam, fluids or gases. The firm are in a position to supply suitable packings and jointings wherever necessary, for use in hydraulics and steam of the highest pressures, oil, chemicals, and all general engineers' requirements.

G. and J. Weir, Ltd., are displaying primary and secondare feed water heaters.

The exhibits of Henry Wiggin and Co., Ltd., comprise examples of the company's nickel and nickel alloy manufactures, including pure nickel, Monel metal, and other nickel alloys.

The products exhibited by H. Windsor and Co., Ltd., comprise a range of over 30 different materials in paint, plastic, tile and compound form, and capable of resisting acids, alkalies, oils and water. The various products can be used alone or in combination to form linings to acid storage, pickling, and bleaching, dyeing or other tanks; for floors and walls of factories and works dealing with acids or other aggressive liquids, for the lining of flues, towers, chimneys dealing with corrosive gases; whilst paints are applied for the protection of plant of all descriptions against the action of acids, alkalies and vegetable or mineral oils.

New Dyestuffs

A Fast Red for Acetate Silk Fibre

DISPERSOL FAST RED AN is similar in shade to the already-established Dispersol Fast Red AS, but it is possessed of considerably better affinity for the acetate silk fibre, is of superior fastness to rubbing and is free from marking off in dry contact with undyed acetate silk. The new product is suitable for dyeing all forms of acetate silk materials and its subdued tone renders it especially useful in the compounding of mode shades. It is recommended for use in the dyeing of ground shades which have subsequently to be discharged, as it gives good whites when discharged by either the Formosul-calcium sulphocyanide or the Formosul-zinc sulphocyanide processes. It possesses very good affinity for the acetate silk fibre and it can be dyed without the addition of assistants to the dyebath; the presence of soap or soluble oil, however, assists penetration and level dyeing. This dyestuff is unaffected by the presence in the dyebath of assistants necessary for the dyeing of other textile fibres, *i.e.*, acids, alkalies, Glauber's salt, etc., and may be used in conjunction with other dyestuffs for the production of solid shades on mixed goods containing acetate silk by the one bath process.

Perth Dyeworks Valuation

Effects of the Depression

PLEADING the effects of trade depression, J. Pullar and Sons, Ltd., the Perth dyeing and cleaning firm, on September 17 obtained a reduction of assessment on works closed down. The appeal at the valuation court concerned the Perth dyeworks at St. Catherine's Road, which were closed down several years ago. The proposed assessments on the buildings were £524 10s. and £220, and the firm asked the court to rule that there should be no assessment.

Mr. A. M. Lamond, solicitor, Perth, explained in support of the appeal that the works had been originally assessed at £1,300. In 1931, when the trade slump came, the proprietors had been compelled to close the works. In that year a small part of the works had been rented at £120, but the bulk of the buildings had remained unoccupied. Considering the difficult position of the dyeing industry, the firm felt it could not go on paying the rates demanded. When the factory was fully occupied, said Mr. Lamond, it would probably be assessed at £1,300, on which his clients would be entitled to the benefit of de-rating. They were now unable to carry on the business, and yet they were asked to pay rates on £724 10s. This struggling industry was being asked to pay twice the figure it would be called upon to pay when the firm was actually carrying on business. De-rating was introduced to help struggling industries.

A Point Contrary to Law

Mr. Arch. McNiven, assessor, said that while it was established by law that property could be entered in the valuation roll without valuation, it was ridiculous and contrary to law to maintain that these buildings, commodious and substantially built as they were, should be entered as of no yearly value. In 1934 the valuation had shown a reduction of £654 10s. on the original valuation of £15,000. The property was in good state of repair, and was in lettable condition. He understood that the owners had negotiated a ten years' let with a furnishing firm at good terms. In view of the substantial reduction made in the last 12 years to cover the trade depression he submitted that no further reduction should be made.

The court decided to reduce the assessments on the main part of the works from £524 10s. to £375 and on the remainder from £220 to £170.

Soap Patents Action

Lever Brothers Sued by United States Companies

LEVER Brothers, Ltd., have won a long drawn-out patent suit involving millions of dollars. The Federal Judge, T. W. Slick, denied the contentions of the Procter and Gamble and the Colgate-Palmolive-Peet corporations that Lever Brothers, Ltd., had infringed patents involving a method of manufacturing Rinso. The case is expected to go before the Supreme Court for a final decision.

The plaintiffs asked for $5,000,000 damages, alleging that their Lamont patent for the manufacture of inflated soap granules was infringed in Lever Brothers' product Rinso, which competes with the plaintiffs' soaps named Supersuds and Ivory Snow.

Judge Slick ruled that Lever Brothers' process was a reasonable improvement on the Lamont patent and does not infringe the plaintiffs' rights. The $5,000,000 claimed was the plaintiffs' estimate of Lever Brothers' profits from Rinso in the seven years prior to 1934.

Synthetic Coumarin in Russia

ACCORDING to a recent bulletin of the U.S.S.R. Chamber of Commerce the Teje (Soap and Perfume Trust) experimental factory in Moscow has produced the first 54 kg. of Soviet coumarin, which has passed all the tests of experts of the perfume and tobacco industry. It is made from chloroform, which was not produced in sufficiently large quantities till the beginning of last year, so that the U.S.S.R. was forced to import it from abroad. Sufficient supplies are now available, however, to produce coumarin in large quantities.

Flame Movement in Gaseous Explosions

Further Investigations Reported by Professor W. A. Bone

A PAPER read before the Royal Society on June 27 embodied the principal results of further investigation of the phenomenon of " spin " in detonation since their previous memoir on the subject in 1932, as made by Professor W. A. Bone, F.R.S., Mr. R. P. Fraser and Dr. W. H. Wheeler. A description was given of the new Fraser high-speed mirror camera which has enabled the accurate measurement of flame movements occurring in as short a time as one-millionth of a second, and some typical photographs of detonation phenomena were shown in illustration of the principal new results obtained.

A new view of the detonation wave in gaseous explosions has been advanced. It can no longer be regarded as simply a homogeneous shock wave in which an abrupt change in pressure in the vicinity of the wave-front is maintained by the adiabatic combustion of the explosive medium through which it is propagated, but it must now be viewed as a more or less stable association, or coalescence, of two separate and separable components, namely, of an intensively radiating flame-front with an invisible shock wave immediately ahead of it. Whether spin is developed or not depends upon the stability or otherwise of their association.

According to this new view, detonation in an explosive gaseous medium is the propagation through it, as a wave, of a condition of intensive combustion, initiated and maintained in a shock wave by radiation from an associated flame-front; and that spin ensues whenever the conditions are such that the radiation from an attenuated flame-front causes a localised intensive excitation of molecules in the shock wave just ahead of it. The resulting " head " of detonation, in which an intensive combustion is thus localised, then begins to rotate in the medium, eventually pursuing a spiral track along the tube quite close to its walls. There is, however, no rotation of the medium as a whole, but only of such a " head " (or maybe " heads ") of detonation.

If in such a " spinning " detonation influences are brought to bear that will in any way destroy the spinning " head," not only does the " spin " itself cease, but separation of the flame-front from the associated shock wave occurs so that the flame speed falls and detonation ceases. The phenomenon can be and is re-established, however, as soon as, from any cause, the distance between the detached, but still radiating, flame-front, and its formerly associated shock wave becomes sufficiently reduced to enable the radiation to restore the former condition.

The experimental part of the work reported was mainly concerned with detonations in a moist $2CO + O_2$ medium, which has proved to be specially adapted to the elucidation of the dual character of the phenomenon. The chief features dealt with were (1) the influence of varying cylindrical tube diameter upon flame speed and frequency of spin, including the separation of the two components of the detonation near the limiting diameter below which it is altogether suppressed; (2) influence of tube shape, including tubes of triangular, square and oblong cross-sections upon the phenomenon, in which it is shown that in the two former cases the head of the detonation pursues a spiral track close up to the walls, of a pitch very nearly that which would have resulted in a tube of circular section with periphery equal to that of the triangle or square actually concerned; (3) the suppression of a spinning detonation by means of a short nitrogen-gap; (4) spin and flame speeds in the detonation of a P_2O_5-dried $2CO + O_2$ medium, in which it is shown that the drying process both increases the flame speed and stabilises the spin; (5) effects of small additions of hydrogen, iron carbonyl, etc., upon the spin; (6) the influences of magnetic and electrical fields upon the phenomenon.

In regard to the last-named it was shown that the flame speed of a moist $2CO + O_2$ detonation is sensibly reduced in passing through a powerful axial magnetic field, and that both " spin " and detonation can be entirely suppressed when the detonation traverses in a negative to positive direction a sufficiently strong electric field, the spin being abruptly upset just as it crosses the negative boundary of the field.

New Technical Books

ALERTE AU GAZ! By S. de Stackelberg. Pp. 238. Lausanne: Librairie Payot et Cie.

The author of this book on first aid in chemical warfare is the Swiss founder of the Violet Cross organisation for international protection against the air menace. He is evidently prepared for the worst, taking it for granted that in a future cataclysm the voice of civilisation is just as likely to be lost in phosgene or lewisite fumes as in the clamour of the guns. Not even the traditional neutrality of Switzerland, in his opinion, will be a guarantee against gas bombardment of his native land. We are forced to agree with his assumption that international conventions prohibiting gas warfare will be brutally disregarded without hesitation. The chapters dealing with protection against gas attack and the treatment of casualities are eminently practical. Separate chapters are devoted to rapid analysis of poison gases, appropriate first aid measures for casualties overcome by one or other of the popular toxic, vesicant or lachrymatory substances (chlorine, phosgene, chloropicrin, mustard gas, diphenylchlorarsine, diphenylcyanarsine, etc.), chemical treatment of gas-contaminated clothing and spaces, the design, filling and care of gas masks, and so forth. How successfully the civilian or soldier trained on these lines will utilise his knowledge when the bombs are raining down is another question. The time will, no doubt, arrive when honours courses in these subjects will be instituted by the universities!

* * *

SHELLAC. By E. J. Parry, F.I.C., F.C.S. Sir Isaac Pitman and Sons, Ltd. pp. 240. 12s. 6d. net.

Originally the lac industry and trade prospered owing to the world-wide demand for lac-dye, etc., the " crimson-lake" of commerce. Fortunately, when lac-dye was superseded by coal-tar products, shellac came into its own, partly for ordinary varnish purposes, later for purposes of electrical insulation, and, finally, gramophone records. In other words, as between lac-dye and shellac, the rôles of product and by-product have been reversed. Mr. Parry's book should commend itself to the business man, to the scientist, and to the student of economics. It shows a wonderful grasp of the many complex problems underlying the shellac industry and trade. Of special importance are the references to the prospects of new fields awaiting development in Burma; to the importance of the host-tree, and of measures to stimulate its powers of resistance; to the rights of parasite attack on lac during secretion and storage; to the facilities and temptations to adulterate; and to the prospects of seed-lac as an economic form of export.

* * *

LIMESTONE AND ITS PRODUCTS. By Alfred B. Searle. pp. 709. Ernest Benn, Ltd. 42s. net.

This is the only book in the English language which not only describes the principal kinds of limestone and the lime and other products obtainable from them, but also the various purposes for which these materials are used in the various industries. By this means readers who wish to sell limestone, lime or other products which are requisite for the industries in which they are engaged will find them stated in clear terms with much other useful information. The book has been specially written for quarry owners, lime burners, cement manufacturers and all users of limestone, chalk, lime, fibres, etc., in a large number of industries. Chemists, students and others will find it invaluable as a text-book on the chemistry and physics of calcium carbonate and its products. The subject of hydrating lime is dealt with fully, and much information of value to builders and other users of this material is published for the first time.

Continental Chemical Notes

Holland

THE CO-OPERATIVE SYNTHETIC FERTILISER FACTORY at Flaardingen reports satisfactory trade during 1934, the sulphuric acid factory working to full capacity throughout the whole year. The turnover, however, was disappointing owing to depreciation of the belga.

Turkey

THE NEW GAS MASK FACTORY in Angora is expected to commence manufacture at the end of October, a yearly output of 300,000 masks being anticipated.

THE FIRST TURKISH TEXTILE COMBINATE is expected to be started up on October 1. From Moscow also comes the report of the laying of the foundation stone of the second textile combinate which, like the first, will be constructed with the aid of Russian technicians.

Russia

THE FIRST EXPERIMENTAL PLANT for indigo manufacture is due to commence operation in the Ukraine and will be followed next year by construction of a large factory.

A PROSPECTING EXPEDITION of the Georaswedka Trust reports discovery of valuable tungsten ore deposits in Russian Turkestan. Important tungsten ore finds are also reported from the Southern Urals.

THE PLASTIC MASSES TRUST is engaged in plans for a new synthetic camphor factory using oil of turpentine as the raw material. During the current year, Russia is expected to produce rosin and turpentine oil to the value of 10 million roubles.

Czecho-Slovakia

ACCORDING TO A REPORT in "Chimische Industrie," September 14, the new rayon factory of the Bata concern near Poprad will commence operations on October 1 with a daily output of 750 kg. During the coming year a decision will be taken regarding possible manufacture of other types of rayon in addition to viscose.

BY USING A CATALYST based upon chromic acid and tin oxide, sulphur dioxide is reported to undergo oxidation to sulphur trioxide in a yield of 96.8 to 97 per cent. when operating at a temperature of 450 to 460° C. The flow of gas can be increased to a marked extent without reducing the yield by fixing the catalyst upon a zeolite support. Such catalysts upon a chromium basis offer the advantage of being very resistant to the action of poisons ("L'Industrie Chimique," August, 1935).

France

NEW USES FOR TRISODIUM PHOSPHATE in the leather industries are indicated by M. Queroix in "Le Cuir Technique." It can be used, for example, for neutralising chrome-tanned leather, for de-tanning semi-chrome leather and for the progressive alkalisation of chrome liquor during tanning.

A NEW METHOD for preparing pure vanadium described by A. Morette in "Compt. rendus," (1935, p. 1110) is based upon reduction of vanadium chloride by a metal such as magnesium or calcium. Satisfactory results are claimed to follow reaction between magnesium and vanadium tetrachloride or dichloride. The former chloride is obtained by exposing vanadium to a stream of chlorine at 500° to 600° C., no oxy-chloride being formed at this temperature. Swept forward in a current of pure dry hydrogen, the gaseous tetrachloride is passed over pure magnesium fillings located in a magnesia boat in an electrically-heated tube. The temperature is gradually raised to 700° C. the total period of heating being 2½ hours. After cooling the boat is covered with a deposit of crystals of vanadium dichloride and trichloride. After washing with water the insoluble residue is desiccated in a vacuum at a low temperature, the final product being a grey powder analysing out at 99.3 per cent. vanadium.

Germany

THE FIRST PLANT FOR SYNTHETIC RUBBER MANUFACTURE is now in course of construction at Piesteritz, near Wittenberg, and is expected to start up not later than December next.

A FRESH OIL FIND HAS BEEN MADE by the Ebag during drilling operations south-west of Oberg. The crude oil is refined by the German Vacuum Oil Co.

COLOUR REACTIONS for distinguishing between tetrahydronaphthalene and decahydronaphthalene described by Castiglioni ("Z. Analyt. Chem.," 1935, No. 11) are based upon condensation of these hydrocarbons with formaldehyde or furfural in an acid medium. To 1 c.c. of alcoholic solution, of 1 gram of the material in 50 c.c. 95 per cent. alcohol, are added 1 c.c. 30 per cent. formaldehyde and 10 c.c. hydrochloric acid (or 2 c.c. concentrated sulphuric acid). Decahydronaphthalene gives colorations ranging from lemon yellow to yellowish-brown, according to the proportion present and the acid used), whereas tetrahydronaphthalene gives red or brownish-red colorations. Using furfural as the reagent, a blue colour is produced with tetrahydronaphthalene and a yellow to greenish-yellow colour with decahydronaphthalene.

Far Eastern Chemical Notes

China

THE LEGISLATIVE ASSEMBLY OF KWANTUNG PROVINCE is sponsoring a 5 million dollar loan to assist development of various manufactures, including sulphuric acid, sodium compounds and fertilisers.

Japan

SEVERAL MANUFACTURERS ARE PLANNING a wide expansion in potassium chlorate production, but prices have not yet been raised owing to competition between various producers. Prominent in this field are Hodogaya Soda Co., Nippon Denki Kogyo K.K. and Nippon Soda K.K.

THE FIRST SUPPLIES OF CITRONELLA OIL, in an estimated yield of 60 tons, are expected to be obtained this season from the Formosa plantations of Takasago Koryo K.K. Although almost entirely dependent at present upon foreign supplies of the oil, a complete transformation is predicted to occur in 2 to 3 years (reports "Japan Chronicle"), by which time the entire requirements should be satisfied from home sources.

Paint Spraying Equipment

An Aid to the Prevention of Corrosion

CORROSION is one of the chief troubles of the chemical engineer. It can be combated to a great extent by spray painting at regular intervals, the spray penetrating so much further into porous metals, rough castings, or wood, than brush painting, which in most cases simply spreads a coat of paint over the top surface. The modern spraying plants can be used for either painting or limewashing which is also another great asset in works such as tanneries and many buildings on a chemical plant.

One of the latest types of portable spraying plants manufactured by A. C. Wells and Co., Ltd., can be supplied with either petrol engine or electric motor drive. The spray guns manufactured by the same company are very up-to-date instruments. The needle valve and all working parts are of stainless steel and the whole instrument is well protected from dirt by means of a sliding shield over the body. These guns, moreover, are capable of spraying all ordinary paints, including limewash, cellulose, synthetic lacquers, rubberised paints, bitumastic and latex solutions, and one instrument is capable of doing the work of three or four brush hands and giving a superior finish.

Modern spraying plant is very economical and clean to use, and when a pressure paint container is used it is possible to get a fan-shaped spray from 10 to 14 inches wide. It will readily be understood that under such conditions large areas can be painted very speedily and efficiently.

Chemical and Allied Stocks and Shares

Current Quotations

THE following table shows this week's Stock Exchange quotations of chemical and allied stocks and shares compared with those of last week. Except where otherwise shown the shares are of £1 denomination.

Name.	Sept. 17.	Sept. 10.
Anglo-Iranian Oil Co., Ltd. Ord.	60/7½	61/3
,, 8% Cum. Pref.	34/9	35/9
,, 9% Cum. Pref.	35/9	36/9
Associated Dyers and Cleaners, Ltd. Ord.	1/10½	1/10½
,, 6½% Cum. Pref.	4/4½	5/-
Associated Portland Cement Manufacturers, Ltd. Ord.	57/-	58/6
,, 5½% Cum. Pref.	27/6	27/6
Benzol & By-Products, Ltd. 6% Cum. Part Pref.	2/6	2/6
Berger (Lewis) & Sons, Ltd. Ord.	62/6	63/9
Bleachers' Association, Ltd. Ord.	5/9	6/-
,, 5½% Cum. Pref.	9/4½	10/-
Boake, A., Roberts & Co., Ltd. 5% Pref. (Cum.)	20/-	20/-
Boots Pure Drug Co., Ltd. Ord. (5/-)	48/9	49/3
Borax Consolidated, Ltd. Pfd. Ord. (£)	97/6	95/7½
,, Defd. Ord.	16/9	16/9
,, 5½% Cum. Pref. (£10)	£11/5/-	£11/5/-
,, 4½% Deb. (1st Mort.) Red. (£100)	£109	£109
,, 4½% 2nd Mort. Deb. Red. (£100)	£104	£104
Bradford Dyers' Association, Ltd. Ord.	8/9	8/9
,, 5% Cum. Pref.	11/3	11/10½
,, 4% 1st Mort. Perp. Deb. (£100)	£88	£88
British Celanese, Ltd. 7% 1st Cum. Pref.	25/-	25/7½
,, 7½% Part. 2nd Cum. Pref.	21/-	22/-
British Cotton & Wool Dyers' Association Ltd. Ord. (5/-)	5/3	5/3
,, 4% 1st Mort. Deb. Red. (£100)	£91	£91
British Cyanides Co., Ltd. Ord. (2/-)	3/6	3/3
British Drug Houses, Ltd. Ord.	20/-	20/-
,, 5% Cum. Pref.	22/6	22/6
British Glues and Chemicals, Ltd. Ord. (4/-)	5/9	5/9
,, 8% Pref. (Cum. and Part.)	27/6	27/6
British Oil and Cake Mills, Ltd. Cum. Pfd. Ord.	47/9¾	47/9¾
,, 5½% Cum. Pref.	26/3	26/3
,, 4¼% First. Mort. Deb. Red. (£100)	£107/10/-	£107/10/-
British Oxygen Co., Ltd. Ord.	106/3	110/-
,, 6½% Cum. Pref.	33/1½	33/1½
British Portland Cement Manufacturers, Ltd. Ord.	93/9	97/6
,, 6% Cum. Pref.	30/-	30/-
Bryant & May, Ltd. Pref.	67/6	67/6
Burt, Boulton & Haywood, Ltd. Ord.	21/3	21/3
,, 7% Cum. Pref.	27/6	27/6
,, 6% 1st Mort. Deb. Red. (£100)	£105/10/-	£105/10/-
Bush, W. J., & Co., Ltd. 5% Cum. Pref. (£5)	108/9	108/9
,, 4% 1st Mort. Deb. Red. (£100)	£96/10/-	£96/10/-
Calico Printers' Association, Ltd. Ord.	8/1½	8/1½
,, 5% Pref. (Cum.)	14/4½	15/-
Cellulose Acetate Silk Co., Ltd. Ord.	11/10½	11/3
,, Deferred (1/-)	2/4½	2/4½
Consett Iron Co., Ltd. Ord.	10/6	10/10½
,, 8% Pref.	27/6	27/6
,, 6% First Deb. stock, Red. (£100)	£107	£107
Cooper, McDougal & Robertson, Ltd. Ord.	35/-	35/-
,, 7% Cum. Pref.	30/-	30/-
Courtaulds, Ltd. Ord.	55/-	56/3
,, 5% Cum.	26/3	26/3
Crosfield, Joseph, & Sons, Ltd. 5% Cum. Pre-Pref.	25/-	25/-
,, Cum. 6% Pref.	28/9	28/9
,, 6½% Cum. Pref.	30/-	30/-
,, 7½% "A" Cum. Pref.	31/10½	31/10½
Distillers Co., Ltd. Ord.	91/9	93/-
,, 6% Pref. Stock Cum.	30/6	30/6
Dorman Long & Co., Ltd. Ord.	21/-	21/-
,, Prefd. Ord.	29/6	31/3
,, 6½% Non-Cum. 1st Pref.	22/6	23/9
,, 8% Non-Cum. 2nd Pref.	20/6	21/3
,, 4% First Mort. Perp. Deb. (£100)	£102/10/-	£102/10/-
,, 5% 1st Mort. Red. Deb. (£100)	£105	£106

Name.	Sept. 17.	Sept. 10.
English Velvet & Cord Dyers' Association, Ltd. Ord.	5/-	5/-
,, 5% Cum. Pref.	8/9	8/9
,, 4% First Mort. Deb. Red. (£100)	£71	£70
Fison, Packard & Prentice, Ltd. Ord.	38/1½	38/1½
,, 7% Non-Cum. Pref.	31/3	31/3
,, 4½% Debs. (Reg.) Red. (£100)	£107	£106
Gas Light & Coke Co. Ord.	27/6	27/6
,, 3½% Maximum Stock (£100)	£91/10/-	£91/10/-
,, 4% Consolidated Pref. Stock (£100)	£109/10/-	£109/10/-
,, 3% Consolidated Deb. Stock, Irred. (£100)	£92/10/-	£92/10/-
,, 5% Deb. Stock, Red. (£100)	£116/10/-	£116/10/-
,, 4½% Red. Deb. Stock (1960-65) (£100)	£114/10/-	£114/10/-
Goodlass Wall & Lead Industries, Ltd. Ord. (10/-)	12/6	12/6
,, 7% Prefd. Ord. (10/-)	13/1½	13/1½
,, 7% Cum. Pref.	30/-	30/-
Gossage, William, & Sons, Ltd. 5% 1st Cum. Pref.	24/4½	24/4½
,, 6½% Cum. Pref.	30/-	30/-
Imperial Chemical Industries, Ltd. Ord.	34/9	34/9
,, Deferred (10/-)	8/4½	8/3
,, 7% Cum. Pref.	32/6	32/9
Imperial Smelting Corporation, Ltd. Ord.	14/9	14/9
,, 6½% Pref. (Cum.)	24/9	24/1½
International Nickel Co. of Canada, Ltd. Cum.	$31¼	$29¼
Johnson, Matthey & Co., Ltd. 5% Cum. Pref. (£5)	105/-	95/-
,, 4% Mort. Deb. Red. (£100)	£98/10/-	£98/10/-
Laporte, B., Ltd. Ord.	107/6	107/6
Lawes Chemical Manure Co., Ltd. Ord. (1/-)	8/1½	8/1½
,, 7% Non-Cum. Part Pref. (10/-)	10/-	10/-
Lever Bros., Ltd. 7% Cum. Pref.	30/6	30/9
,, 8% Cum. "A" Pref.	32/6	32/6
,, 20% Cum. Prefd. Ord.	76/10½	76/10½
,, 5% Cons. Deb. (£100)	£107	£107
,, 4% Cons. Deb. (£100)	£104	£104
Magadi Soda Co., Ltd. 12½% Pref. Ord. (5/-)	1/3	1/3
,, 6% 2nd Pref. (5/-)	6d.	6d.
,, 6% 1st. Debs. (Reg.)	£55	£58
Major & Co., Ltd. Ord. (5/-)	7½d.	7½d.
,, 8% Part. Prefd. Ord. (10/-)	9d.	9d.
,, 7½% Cum. Pref.	1/6¾	1/6¾
Pinchin, Johnson & Co., Ltd. Ord. (10/-)	40/-	41/-
,, 1st Pref. 6¼% Cum.	33/1½	33/1½
Potash Syndicate of Germany (Deutsches Kalisyndikat G.m.b.H.) 7% Gld. Ln. Sr. "A" and "B" Rd.	£64/10/-	£67
Reckitt & Sons, Ltd. Ord.	113/1½	113/9
,, 4½% Cum. 1st Pref.	25/-	25/-
Salt Union, Ltd. Ord.	43/9	43/9
,, Pref.	46/3	46/3
,, 4½ Deb. (£100)	£109/10/-	£109/10/-
South Metropolitan Gas Co. Ord. (£100)	£127/10/-	£128/10/-
,, 6% Irred. Pref. (£100)	£149/10/-	£149/10/-
,, 4% Pref. (Irred.) (£100)	£108/10/-	£108/10/-
,, Perpetual 3% Deb. (£100)	£90/10/-	£90/10/-
,, 5% Red. Deb. 1950-60 (£100)	£115/10/-	£115/10/-
Staveley Coal & Iron Co., Ltd. Ord.	26/3	26/3
Stevenson & Howell, Ltd. 6½% Cum. Pref.	73/1½	76/3
Triplex Safety Glass Co., Ltd. Ord. (10/-)	29/4½	29/4½
Unilever, Ltd. Ord.	29/3	29/9
,, 7% Cum. Pref.	40/-	41/-
United Glass Bottle Manufacturers, Ltd. Ord.	33/-	33/-
,, 7½% Cum. Pref.	18/9	18/9
United Molasses Co., Ltd Ord. (6/8)	23/9	23/9
,, 6% Cum. Pref.	6/6	6/9
United Premier Oil & Cake Co., Ltd. Ord. (5/-)	23/9	23/9
,, 7% Cum. Pref.	£101	£101
,, 6% Deb. Red. (£100)		

Weekly Prices of British Chemical Products

Review of Current Market Conditions

THERE are no price changes to report in the markets for heavy chemicals, rubber chemicals, wood distillation products, coal tar products, perfumery chemicals and intermediates. In the pharmaceutical section there has been an increase in the price of menthol, while there have been a number of price changes in essential oils. Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works.

LONDON.—Market conditions have remained steady in London and there are no changes to report. In the coal tar products section, pitch is quoted at about 30s. to 32s. 6d. per ton f.o.b., East Coast port, for this season's delivery.

MANCHESTER.—The trend of values on the Manchester market for chemicals continues steady to firm in nearly every section, but although there seems to be little to be gained by holding off not a great deal of fresh forward buying, apart from a moderate volume of replacement business, is being entered into just now, and no marked improvement is looked for until next month when there should be an awakening of interest in contracts. In the meantime, there is a fairly steady flow of specifications for delivery of textile and other chemicals against existing commitments, and, compared with the experience during most other months this year, sellers have not much ground for complaint in this respect. Among the by-products the light materials are firmer in tendency and more buying interest in toluol and other products has been displayed. Pitch, however, remains easy and relatively quiet.

SCOTLAND.—There has been a steady day-to-day demand for chemicals for home trade during the week, but export inquiries have been rather limited. Prices generally continue very firm at about previous figures with only slight changes to report.

Price Changes

Pharmaceutical and Photographic Materials.—MENTHOL, A.B.R. recryst., B.P., 12s. 6d. per lb.

Essential Oils.—ANISE, 2s. 2d. per lb.; BERGAMOT, 6s. 6d. BOURBON GERANIUM, 22s. 6d.; CINNAMON, Ceylon, 3s. 3d.; CASSIA, 80/85%, 6s.; CITRONELLA, Java, 1s. 4d.; LAVENDER, Mont Blanc, 38/40%, 26s. 6d.; LEMON, 8s.; LEMONGRASS, 2s. 9d.; PEPPERMINT, Japanese, 6s.; Wayne County, 10s. 3d.; PETITGRAIN, 5s. 9d.

All other prices remain unchanged.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £38 5s. to £40 5s.; pure 80%, £39 5s.; tech., 40%, £20 5s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. LONDON: Tech., 80%, £38 5s. to £40 5s.; pure 80%, £39 5s. to £41 5s.; tech., 40%, £20 5s. to £22 5s.; tech., 60%, £29 5s. to £31 5s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech., 80%, £38 5s., d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—Commercial granulated, £25 10s. per ton; crystal, £26 10s.; powdered, £27 10s.; extra finely powdered, £29 10s. packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. SCOTLAND: Crystals, £26 10s.; powder, £27 10s.

ACID, CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—11¾d. per lb. MANCHESTER: 11¾d. to 1s. SCOTLAND: 11¾d.

ACID, CRESYLIC.—97/100%, 1s. 5d. to 1s. 6d. per gal.; 99/100%, refined, 1s. 9d. to 1s. 10d. per gal. LONDON: 98/100%, 1s. 5d. f.o.r.; dark, 1s.

ACID, FORMIC.—LONDON: £40 to £45 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £48; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works. SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £48 to £50 ex store. MANCHESTER: £49 to £55 ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. SCOTLAND: 1s. 0¼d. less 5%. MANCHESTER: 1s. 0¾d. per lb.

ALUM.—SCOTLAND: Lump potash, £8 10s. per ton ex store

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND: Spot, £34 per ton, c.i.f. U.K ports.

ANTIMONY SULPHIDE.—Golden, 6¼d. to 1s. 3d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—IONDON: £16 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £22, ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—LONDON: £10 10s. per ton. SCOTLAND: £10 10s. to £10 15s.

BARYTES.—£6 10s. to £8 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%, £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 to £9 5s.

BORAX, COMMERCIAL.—Granulated, £14 10s. per ton; crystal, £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots.

CADMIUM SULPHIDE.—3s. 4d. to 3s. 8d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£31 to £33 per ton, drums extra.

CARBON BLACK.—3¾d. to 4¼d. per lb. LONDON: 4¼d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 3¼d. per lb.; liquor, £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £3 16s. 6d. net.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £25 10s. per ton. SCOTLAND: 40%, £25 to £28 ex store.

IODINE.—Resublimed B.P., 6s. 3d. to 8s. 4d. per lb.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £34 10s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £33 to £35; brown, £1 per ton less. MANCHESTER: White, £34 10s.; brown, £32 10s.

LEAD NITRATE.—£28 to £29 per ton.

LEAD, RED.—SCOTLAND: £24 to £26 per ton less 2½%; d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid. LONDON: £36 10s.

LITHOPONE.—LONDON: 30%, £16 to £17 per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NICKEL AMMONIUM SULPHATE.—£49 per ton d/d.

NICKEL SULPHATE.—£49 per ton d/d.

PHENOL.—6¾d. to 7½d. per lb. to December 31.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £39.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. less 5%, d/d U.K. Ground, 5½d. LONDON: 5d. per lb. less 5%, with discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100%, powder, £37. MANCHESTER: £37 10s.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P., 5s. 2d. per lb.

POTASSIUM NITRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. crystals, 10d. to 10½d. MANCHESTER: B.P., 11¾d. to 1s.

POTASSIUM PRUSSIATE.—LONDON: Yellow, 8¾d. to 8¾d. per lb.

SCOTLAND: Yellow spot, 8¼d. ex store. MANCHESTER: Yellow, 8¼d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £36.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£21 10s. per ton. LONDON: £22. SCOTLAND: £20 15s.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 15s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. Anhydrous, 5d. per lb. LONDON: 4d. per lot less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. basis. SCOTLAND: 4d. delivered buyer's premises with concession for contracts.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash, £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£32 10s. per ton. SCOTLAND: 3⅜d. per lb.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10 5s.; photographic, £14 10s.

SODIUM META SILICATE.—£14 per ton, d/d U.K. in cwt. bags.

SODIUM IODIDE.—B.P., 6s. per lb.

SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.

SODIUM PERBORATE.—10%, 9¼d. per lb. d/d in 1-cwt. drums. LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£13 per ton.

SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 5½d.

SODIUM SILICATE.—140° Tw. Spot, £8 per ton. SCOTLAND: £8 10s.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material, £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 5s.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid, 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 2s. 6d.

SODIUM SULPHITE.—Pea crystals, spot, £13 10s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.

SULPHUR.—£9 10s. to £9 15s. per ton. SCOTLAND: £8 to £9.

SULPHATE OF COPPER.—MANCHESTER: £14 2s. 6d. per ton f.o.b.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 4s. 5d. to 4s. 7d. per lb.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINZ SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.

ZINC SULPHIDE.—10d. to 11d. per lb.

Coal Tar Products

ACID, CARBOLIC.—Crystals, 6¾d. to 7½d. per lb.; crude, 60's, 1s. 11d. to 2s. 2½d. per gal. MANCHESTER: Crystals, 7d. per lb.; crude, 2s. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d. 2s. 7d.

ACID, CRESYLIC.—90/100%, 1s . 8d. to 2s. 3d. per gal.; pale 98%, 1s. 5d. to 1s. 6d.; according to specification. LONDON: 98/100%, 1s. 4d.; dark, 95/97%, 1s. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; dark, 97/99%, 1s. to 1s. 1d.; high boiling acid, 2s. 6d. to 3s.

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 7½d. to 1s. 8d. LONDON: Motor, 1s. 3½d. SCOTLAND: Motor, 1s. 6½d.

CREOSOTE.—B.S.I. Specification standard, 6d. per gal. f.o.r. Home, 3½d. d/d. LONDON: 4½d. f.o.r. North; 5d. London. MANCHESTER: 5¼d. to 5¾d. SCOTLAND: Specification oils, 4d.; washed oil, 4¼d. to 4¾d.; light, 4¼d.; heavy, 4¼d. to 4¾d.

NAPHTHA.—Solvent, 90/100%, 1s. 5d. to 1s. 6d. per gal.; 95/160%, 1s. 6d.; 99%, 11d. to 1s. 1d. LONDON: Solvent, 1s. 3¾d. to 1s. 4½d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.

NAPHTHALENE.—Purified crystals, £10 per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.

PYRIDINE.—90/140%, 5s. 6d. to 8s. per gal.; 90/180, 2s. 3d.

TOLUOL.—90%, 1s. 11d. to 2s. per gal.; pure, 2s. 2d.

XYLOL.—Commercial, 1s. 11d. to 2s. per gal.; pure, 2s. 1d. to 2s. 2d.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.

ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.

ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 8d. per lb.

ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.

ACID, SULPHANILIC.—Spot, 8d. per lb. 100%, d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.

BENZIDINE BASE.—Spot, 2s. 5d. per lb., 100% d/d buyer's works.

BENZIDINE HCL.—2s. 5d. per lb.

p-CRESOL 34-5° C.—1s. 9d. per lb. in ton lots.

m-CRESOL 98/100%.—1s. 11d. per lb. in ton lots.

DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.

DINITROBENZENE.—8d. per lb.

DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 10½d.

DINITROCHLORBENZENE, SOLID.—£72 per ton.

DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.

α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.

β-NAPHTHOL.—Spot, £78 15s. per ton, in paper bags.

α-NAPHTHYLAMINE.—Spot, 11½d. per ton., d/d buyer's works.

β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works.

o-NITRANILINE.—3s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb., d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5d. per lb.; 5-cwt. lots, drums extra.

NITRONAPHTHALENE.—9d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.

o-TOLUIDINE.—9½d. to 11d. per lb.

p-TOLUIDINE.—1s. 11d. per lb.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 to £9. Grey, £11. Liquor, brown, 30° Tw., 8d. per gal. MANCHESTER: Brown, £9 10s.; grey £12.

ACETIC ACID, TECHNICAL, 40%.—£17 to £18 per ton.

METHYL ACETONE.—46-50%, £43 to £47 per ton.

WOOD CREOSOTE.—Unrefined, 3d. to 1s. 6d. per gal.

WOOD NAPHTHA, MISCIBLE.—2s. 6d. to 3s. 6d. per gal.; solvent, 3s. 3d. to 4s. 3d. per gal.

WOOD TAR.—£2 to £4 per ton.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—Neutral quality basis 20.6% nitrogen £7 5s. per ton, less 9s. per ton for September delivery. This price of £6 16s. delivered to farmer's nearest station in 6-ton lots is the same price as for September, 1934. For delivery later than September no prices have yet been announced.

CALCIUM CYANAMIDE.—For September delivery £6 16s. 3d. per ton delivered in 4-ton lots to farmer's nearest station.

NITRO-CHALK.—The price for the new season has been announced at £7 5s. per ton delivered in 6-ton lots to farmer's nearest station—all terms and conditions the same as for the season 1934/35.

NITRATE OF SODA.—The price for this product for the 1935/36 season has been announced at £7 12s. 6d. per ton delivered in 6-ton lots to farmer's nearest station—all terms and conditions the same as for the season 1934/35.

CONCENTRATED COMPLETE AND NITROGEN PHOSPHATE FERTILISERS.—Up to the present no prices have been announced for the year 1935/36 and the June prices remain in force for prompt delivery.

Latest Oil Prices

LONDON, Sept. 18.—LINSEED OIL closed easier. Spot, £26 (small quantities), Oct. and Oct.-Dec., £23 10s.; Jan.-April, £23 12s. 6d.; May-Aug., £24, naked. SOYA BEAN OIL was firm. Oriental (bulk), Oct.-Nov. shipment, £19 10s. RAPE OIL was dearer. Crude extracted, £32; technical refined, £33 10s. naked, ex wharf COTTON OIL was steady. Egyptian crude, £24 10s.; refined, common edible, £28 10s.; deodorised, £30 10s., naked, ex mill (small lots £1 10s. extra). TURPENTINE was steady. American, spot, 47s. 3d. per cwt.

HULL.—LINSEED OIL, spot, quoted £24 10s. per ton; Sept., Oct.-Dec., and Jan.-April, £24. COTTON OIL, Egyptian, crude, spot, £25 10s.; edible, refined, spot, £27 10s.; technical, spot, £27 10s.; deodorised, £29 10s., naked. PALM KERNEL OIL, crude, f.m.q., spot, £19, naked. GROUNDNUT OIL, extracted, spot, £32 10s.; deodorised, £35 10s. RAPE OIL, extracted, spot, £31; refined, £32 10s. SOYA OIL, extracted, spot, £23; deodorised, £26 per ton. COD OIL, f.o.r or f.a.s, 25s. per cwt. in barrels. CASTOR OIL, pharmaceutical, 42s. per cwt.; firsts, 37s.; seconds, 34s. TURPENTINE not quoted.

Inventions in the Chemical Industry

Patent Specifications and Applications

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Complete Specifications open to Public Inspection

BUTYL ALCOHOL by fermentation, producing.—Commercial Solvents Corporation. March 8, 1934. 29131/34.

MORDANT DISAZO DYESTUFFS, manufacture.—Durand and Huguenin A.-G. March 5, 1934. 6741/35.

SALTS OF CYCLIC NITROGEN BASES, manufacture.—I. G. Farbenindustrie. March 3, 1934. 6742/35.

POLYVALENT METAL SALTS, and compositions containing same.—Resinous Products and Chemical Co. March 5, 1934. 6824/35.

CONVERTING ALKALI SALTS of phenylalkyl barbituric acids into stable calcium compounds.—R. Grüter. March 5, 1934. 6883/35.

HYDRATED OLEFINES, production.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. March 5, 1934. 6953/35.

INDUSTRIAL WASTE LIQUIDS, purification.—E. Fromke. March 6, 1934. 7070/35.

VAT DYESTUFFS, manufacture.—I. G. Farbenindustrie. March 7, 1934. 7164/35.

Specifications Accepted with Date of Application

WET PURIFICATION OF GASES.—W. Learmonth, G. Nonhebel, J. L. Peason, and Imperial Chemical Industries, Ltd. Feb. 5, 1934. 434,590.

HYDROGEN PEROXIDE, process of producing.—F. Krauss. Feb. 24, 1934. 434,488.

ACRIDINIUM COMPOUNDS, manufacture.—I. G. Farbenindustrie. March 4, 1933. 434,497.

QUATERNARY AMMONIUM COMPOUNDS, manufacture and application.—I. G. Farbenindustrie. March 3, 1933. 434,602.

DIAZONIUM COMPOUNDS from 4-aminodiarylamines, manufacture. I. G. Farbenindustrie. March 7, 1933. 434,725.

HYDROCARBON MIXTURES, separation.—Standard Oil Development Co. June 10, 1933. 434,672.

ALKALI CELLULOSE, manufacture.—W. W. Groves (I. G. Farbenindustrie). March 16, 1934. 434,540.

METHOD OF REMOVING CARBON DISULPHIDE from gases.—Naamlooze Vennootschap Machinericen-en Apparaten Fabriken Meaf. March 31, 1933. 434,673.

AMMONIUM SULPHATE, process for the manufacture.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. June 24, 1933. 434,622.

HYDROCARBON PRODUCTS by treatment of distillable carbonaceous materials with hydrogenating gases, production.—H. E. Potts (International Hydrogenation Patents Co., Ltd.). June 19, 1934. 434,624.

VERTICAL RETORTS for the continuous distillation of carbonaceous materials.—F. J. West, E. West and West's Gas Improvement Co. Aug. 9, 1934. 434,562.

VINYL ALCOHOL, manufacture.—Chemische Forschungsges. Nov. 25, 1933. 434,580.

HYDROCARBON MIXTURES, separation.—Standard Oil Development Co. June 10, 1933. 434,714.

Applications for Patents

(September 5 to 11 inclusive.)

SEPARATION OF VOLATILISED LIQUIDS from gaseous mixtures.—H. A. Auden and H. M. Hutchinson. 24961.

HYDROGENATION OF LIQUID HYDROCARBONS.—J. S. Bradley and J. Sackett. 24786.

HEAVY CALCIUM AND BARIUM SULPHATES.—A. V. Brancker. 24924.

LEAD PIGMENTS, manufacture.—P. D. Brossman and Dupont Viscoloid Co. 25195.

DYEING CELLULOSE ESTERS with azo dystuffs.—A. Carpmael (I. G. Farbenindustrie). 25186.

CONDENSATION PRODUCTS, manufacture.—A. Carpmael (I. G. Farbenindustrie). 25284.

TETRAKISAZO DYESTUFFS containing copper, manufacture.—A. Carpmael (I. G. Farbenindustrie). 25285.

VOLATILISED LIQUIDS from gaseous mixtures, separation.—Distillers Co., Ltd., and H. P. Staudinger. 24961.

WATER GAS from coal, production.—F. L. Duffield. 24954.

PARAFORMALDEHYDE, manufacture.—E. I. due Pont de Nemours and Co 24883.

DRYING OIL ACID ESTERS of abietyl, etc., alcohols.—E. I. du Pont de Nemours and Co. and H. S. Rothrock. 24884.

VARNISHES, manufacture.—E. I. du Pont de Nemours and Co. and H. S. Rothrock. 24885.

DYESTUFFS, manufacture.—E. I. du Pont de Nemours and Co. (United States, Sept. 10, '34.) 25194.

MORDANT DYESTUFFS, manufacture.—Durand and Huguenin A.-G. (Germany, Sept. 5, '34.) 24781.

THREADS FROM VISCOSE, manufacture.—W. W. Groves (I. G. Farbenindustrie). 24783.

2 : 6-DIMETHYLNAPHTHALENE-8-SULPHONIC ACID, manufacture.—W. W. Groves (I. G. Farbenindustrie). 24956.

AZO DYESTUFFS, manufacture.—W. W. Groves (I. G. Farbenindustrie). 24959.

WATER-SOLUBLE AZO DYESTUFFS, manufacture.—W. W. Groves (I. G. Farbenindustrie). 25048.

METHYL-AMINONAPHTHALENE-SULPHONIC ACIDS, manufacture.—W. W. Groves (I. G. Farbenindustrie). 25049.

QUATERNARY AMMONIUM COMPOUNDS, manufacture.—W. W. Groves (I. G. Farbenindustrie). 25151.

VAT DYESTUFFS, manufacture.—I. G. Farbenindustrie. (Germany, Sept. 8, '34.) 24913.

CYANINE DYES, manufacture.—I. G. Farbenindustrie. (Germany, Sept. 7, '34.) 25051.

AZO DYESTUFFS, manufacture.—I. G. Farbenindustrie. (Germany, Sept. 11, '34.) 25266.

AZO DYESTUFFS, manufacture.—I. G. Farbenindustrie. (Germany, Sept. 12, '34.) 25267.

THERAPEUTICALLY ACTIVE COMPOUND of hexamethylenetetramine, production.—Kali-Chemie A.-G. (Germany, Oct. 15, '34.) 24814.

HIGH VISCOSITY ORGANIC ESTERS of cellulose.—Kodak, Ltd. (United States, Sept. 5, '34.) 24766.

OXYGEN-EVOLVING COMPOSITIONS.—L. A. Levy. 24895.

CATALYTIC OXIDATION OF KETOLS, process.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (United States, Sept. 22, '34.) 25179.

ORGANIC PEROXIDES, manufacture.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (Holland, Sept. 14, '34.) 25287.

CONVERSION OF OILS, etc., into elaidic acid.—Naamlooze Vennootschap Ned. Research Centrale. (Holland, Sept. 7, '34.) 24960.

WATER-GAS, manufacture.—H. Nielsen. 25243.

PROCESS FOR RENDERING USEFUL GASOL, etc., contained in industrial gases.—Ruhrchemie A.-G. (Germany, Sept. 5, '34.) 24799.

CHLORHYDRINES, preparation.—Soc. Carbochimique Sos. Anon. (Grance, April 15.) 25041.

CHLORHYDRINES, valorisation.—Soc. Carbochimie Soc. Anon. (France, Dec. 24, '34.) 25042.

HYDROCARBON OILS, processes for refining.—Texaco Development Corporation. (United States, Sept. 12, '34.) 25278.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

TIMOTHY WHITES & TAYLORS, LTD. (late Timothy Whites (1928), Ltd.), London, S.W., chemists, etc. (M., 21/9/35.) Reg. Sept. 9, £1,000,000 deb. stock and a premium of 2½ per cent. in certain events (secured by Trust Deed dated Sept. 6, 1935); general charge. *Nil. Jan. 11, 1935.

London Gazette, etc.

Companies Winding-up Voluntarily

FAILSWORTH DYEING AND FINISHING CO., LTD. (C.W.U.V., 21/9/35.) By special resolution Sept. 9. Mr. Archie Stafford, of "Haigh Lea," Whitefield Road, Sale, Cheshire, appointed liquidator.

From Week to Week

LAWES' CHEMICAL MANURE CO., LTD., Creeksmouth, Barking, have changed their name to Lawes Chemical Co., Ltd.

WE HAVE RECEIVED from W. S. Dahl some examples of straw powder, coconut powder and wood flour. These powders are used in the explosive, bakelite and linoleum industries. Further information on application to Mr. S. Dahl, 93 Cannon Street, London, E.C.4.

THE INSTITUTION OF CHEMICAL ENGINEERS will hold its opening meeting of the 1935-36 session on October 9, at 6 p.m., in the rooms of the Chemical Society, Burlington House, London, when a paper on "Modern Methods of Welding" will be presented by Mr. C. H. Davy. The chair will be taken by the president, Dr. Herbert Levinstein.

TWENTY GIRLS RAN FOR SAFETY when a fire, followed by an explosion, broke out at Crane fireworks factory, Warmley, near Bristol, on September 17. Four girls were injured and are in hospital. The four girls, with another, were working in the finishing shop when fire broke out. They ran to escape through a door at one end of the shed, but an explosion occurred, and they were badly burned about the arms and legs. All the windows in the workshop were blown out and some hundreds of thousands of fireworks exploded.

PLANS FOR ADDITIONS AND EXTENSIONS to existing property, belonging to the Scottish Oils Refinery at Grangemouth, at an estimated cost of £2,600, have been passed by Grangemouth Dean of Guild Court. Mr. Thomson, chief engineer for the firm, moved for warrant to proceed with extensions to the jetty pump-house, the gas compressor house, the M.S. and kero washing house, and No. 5 pump-house, a sump for wash-down tanks, one cracked spirit tank, 35 ft. in diameter by 17 ft. 6 in., an S.O. 2-top tank, 27 ft. by 16 ft., and one topping plant receiver tank, 27 ft. in diameter by 12 ft.

REGARDING HERR HITLER'S ANNOUNCEMENT that Germany would soon be producing artificial rubber, the Ministry of Economics says that experiments with artificial rubber have been carried out for some months. The outcome justifies the hope of final success, but the experiments have not yet been concluded. Several laboratories are engaged in this work and various kinds of synthetic rubber have been produced. Whether the final product is among them cannot as yet be said. Only practical tests can show this. As long as a product which is not absolutely suitable for commercial purposes has not been produced mass production cannot be started.

A NEW STEEL FOUNDRY now nearing completion at Benoni, Transvaal, will shortly reach the production stage. This enterprise is the result of collaboration between the Standard Brass and Iron Foundry, Ltd. (associated in South Africa with J. Stone and Co., Ltd., of Deptford), and Edgar Allen and Co., Ltd., of the Imperial Steel Works, Sheffield. Experienced Edgar Allen foundry men are now co-operating in organising the new foundry, in which it is intended to produce not only the general run of engineering castings, such as skip wheels, tappets, cams, etc., but various alloy steel castings for special purposes.

A DECLARATION OF SOLVENCY was filed on September 7 relating to Phosferine (Ashton and Parsons), Ltd., which was registered in 1928. No mortgages or charges have been registered. The directors are Sir Herbert J. F. Parsons, Harold E. S. Parsons, George W. Caton, Francis H. C. Tallach, John A. Kenningham and Herbert J. F. Parsons. An agreement has been approved for the sale of the undertaking of the company to the Veno Drug Co. for £480,000 cash and interest thereon from May 1, 1935, at 7 per cent. per annum, and also a contribution of £1,000 towards the costs of sale. This will be sufficient to repay the £400,000 of 8 per cent. cumulative participating ordinary £1 shares, and 4s. per share on the 400,000 5s. deferred shares. A meeting of the shareholders will be held to place the company in voluntary liquidation.

FIVE THOUSAND PEOPLE attended the founder's day celebrations of Lever Brothers, Ltd., at their sports ground, New Eltham, S.E., on September 14. Every employee had his or her fare paid and a free tea in large marquees. The band of the Scots Guards played under the direction of Lieutenant H. E. Dowell. At dusk there was a fireworks display, one of the set pieces being of the first Viscount Leverhulme, founder of the firm, in memory of whom the celebrations have been held annually since his death on May 7, 1925. There were sports and other competitions in which nearly 300 persons took part. Lord Leverhulme was present, and inspected the Unilever Band of the British Legion. Most of the 500 members paraded under Mr. L. F. Fildes, and a two minutes' silence was observed in memory of fallen comrades. During the presentation of prizes by Mrs. Hartland-Swann, wife of Mr. L. H. Hartland-Swann, of the board of directors, a gold watch was presented to Arthur Herbert Payne, steward and groundsman of the Unilever sports ground, New Eltham, for bravery in stopping a runaway horse last December.

IT IS REPORTED THAT STIMPSON BROS., chrome tanners, Northampton, will continue chrome tanning at Northampton, and that the Cork factory will carry out the dyeing and finishing only of the Irish productions.

PRAGUE 31ST FAIR CLOSED on September 8 after brisk business. It has, this time, too, kept fully its export feature, and especially must this fact be considered as a success. The number of visitors to the Fair was higher than that to the autumn fair, 1934.

IN SPITE OF WARNINGS given repeatedly, three or four more fatalities and many severe burning accidents have resulted from the use of sodium chlorate as a weed-killer in New Zealand. Injuries have also resulted to some farmers who have used sodium chlorate mixed with sulphur or sugar for blasting purposes. Two or three farmers have been prosecuted.

FALMOUTH CHAMBER OF COMMERCE, at its September meeting, received an intimation from the Associated Chambers of Commerce that cargoes of china clay sent to Germany must be accompanied by certificates of origin, which certificates must now conform with the specimen form, otherwise the Reich Bank would refuse payment. It was stated by the secretary that the Falmouth Chamber was the only body in Cornwall at the present time which could issue a certificate of origin, and that it would be only too glad to give merchants in the county the necessary visa.

THE COMMERCIAL SECRETARY to the British Embassy at Rome calls attention to a communiqué warning Italian importers that they must abstain from placing orders abroad unless they possess the corresponding import licence. United Kingdom firms should not despatch goods to Italy until an assurance has been received that the corresponding import permits are actually in the hands of the Italian customer. This warning applies, of course, equally to United Kingdom merchant firms which arrange for shipment, against payment in London, of goods direct from Empire and foreign markets to Italy.

THE NEXT MEETING of the Society of Public Analysts will be held on October 2 at the Chemical Society's Rooms, Burlington House, at 8 p.m. The following papers will be read: "The Chemical Examination of Furs in relation to Dermatitis. Part VI.—The Identification of Vegetable and other Dyes," by H. E. Cox, D.Sc.; "Testing for Sea Water Damage," by W. M. Seaber; and "The Iodimetric Titration of Tin," by F. L. Okell and John Lumsden. Four candidates for admission to the Society will be balloted for. Arrangements have been made for members and their friends to dine together at Stewart and Co.'s Restaurant, 50 Old Bond Street, at 6.30 p.m.

Personal Notes

MR. JOHN WILLIAM TRICKETT, a well-known Sheffield steelmaker, has died in his 82nd year. He had been connected with Ibbotson Bros. and Co., Globe Steel Works, ever since leaving school and had been a director of the company for the past forty years.

MR. J. L. WILSON GOODE, British Trade Commissioner at Vancouver, is at present in this country on an official visit. Mr. Wilson Goode will be available at the Department of Overseas Trade on October 1 and 21 for the purpose of interviewing manufacturers and merchants interested in the export of United Kingdom goods to Western Canada. Between these dates he will visit a number of industrial centres in the provinces.

SIR ROBERT MURRAY HYSLOP, a noted industrialist, died on September 11 in London after a brief illness. After completing his education at University College, London, Sir Murray joined Lloyd's as an underwriter in 1890. He acted in this capacity for nine years, and then became interested in heavy industrial undertakings. Having become associated with concerns in South Staffordshire, he quickly established himself as one of the foremost ironmasters. As a member of the Iron and Steel Institute, he played a prominent part in the affairs of that body. He was a director of many companies, including Bayliss, Jones and Bayliss, Ltd.

MR. FRANK BAINBRIDGE, who is employed in the chemistry department of the Skinningrove Iron Co., Ltd., Middlesbrough, has been elected president of the Cleveland Institution of Engineers. He succeeds Mr. W. Routledge, of Marton. Mr. Bainbridge is the son of the late Mr. George Bainbridge, a former town clerk of Middlesbrough. He joined the Skinningrove Iron Co. in 1911. He has been a member of the Cleveland Institution of Engineers since 1915 and became a member of the Association Council in 1923. He is a Fellow of the Chemical Society and holds the Carnegie Gold Medal of the Iron and Steel Institute for researches on basic slag (1920). He was awarded the William Prize in 1931 by the same Institution.

Company News

William Blythe and Co.—A payment of 3 per cent., the same as last year, is announced.

N.T. Artificial Wool Co.—The report to June 30, shows a net income of £880 (against £623), increasing credit brought in to £4,913.

United Premier Oil and Cake Co., Ltd.—The company has declared an interim dividend of 4 per cent. for the year 1935. For the whole of 1934 a dividend of 7½ per cent. was paid, the first since 6 per cent. was distributed for 1924.

United Turkey Red.—A dividend on the 4 per cent. first cumulative preference shares for the half year to June 30 is announced payable on September 26. No dividend is being paid on 5½ per cent. second cumulative preference or ordinary shares at this time.

Raffinerie De Petrole Du Nord.—The report for the year ended March 31, 1935, shows a loss of Frs.56,589,406, against a net profit of Frs.7,049,268 in 1933-34. Subscription for Frs.100,000,000 new shares is assured by principal creditors, notably by Petrofina.

Virgina-Carolina Chemical Corporation.—The report for the year to June 30 shows net profits, after $554,364 (against $527,092) to depreciation, of $1,277,578 ($492,377). Accumulated dividends of $24.50 per share on 7 per cent. cumulative dividend prior preference stock was reduced to $16.50 per share by payment on August 12, 1935, of a dividend thereon of $8 per share.

Thorncliffe Coal Distillation, Ltd.—The report for the year ended June shows that, after allowing for depreciation and tax, there is a profit of £51,949, which, with the amount brought forward, makes £75,061; payment of two years' preference dividend leaves £26,288 to carry forward. The directors state that the coke market has further hardened, but there is still room for improvement.

Staveley Coal and Iron Co.—The directors report a profit of £518,983 for the year ended June 30 (against £468,973). Depreciation absorbs £186,242, directors' fees and tax £6,451, leaving £326,289, which with the amount brought forward makes £429,571. The dividend is 8 per cent., tax free, against 6½ per cent., tax free; £50,000 is placed to general reserve; and £10,000 provided for further depreciation of workmen's houses, leaving to be carried forward £98,742.

Vick Chemical, Inc. (U.S.).—The estimated net profit for the quarter to June 30 amounted to $325,736, after taxes and charges, equal to 47c. a share (against $719,015, or $1.02 a share in preceding quarter and $191,118, or 27c. in June quarter of preceding year); current assets at June 30, including $5,390,154 cash and marketable securities, amounted to $7,503,389, and current liabilities were $675,328 (against cash and securities $5,922,441, current assets of $7,941,341 and liabilities $1,025,413 on December 31, 1934). Total assets at June 30 aggregated $8,313,865 ($8,784,440), capital surplus $1,752,648 (same), earned surplus $2,384,489 ($2,179,979).

Lafarge Aluminous Cement.—The report for the year to March 31 shows a profit £24,636; deducting debit balance on profit and loss of £666, there remains a balance of £23,971. The directors point out that no provision has been made for depreciation of the factory plant, etc., since inception of company in 1923; they recommend that £23,000 be allocated to a depreciation account and £971 be carried forward. The directors consider that unless there is a considerable decline in company's trade during next six months, it should be possible to resume preference dividends in April, 1936; no dividend has been paid on first preference shares since March 31, 1925. Meeting, 296-302 High Holborn, London, W.C.1, September 25, at 11 a.m.

New Companies Registered

Associated Cellulose Supplies, Ltd., Coventry House, 3 South Place, E.C.2.—Registered September 11. Nominal capital £1,500. Film cleaning, chemical and/or celluloid manufacturers, agents and dealers, engineers, manufacturers of and dealers in chemical and celluloid by-products, etc. Directors: Sidney H. Rawson, Fdk. C. Rawson.

W. H. Berrisford, Ltd., Charnes Farm House, near Eccleshall, Staffs.—Registered September 13. Nominal capital £100,000. To exploit, develop and work, and grant licences in respect of inventions for improvements relating to the cleaning or other treatment of coal or other minerals or substances, or any other inventions, formulae, processes or information in regard to appliances, products, components, metals, chemicals, ingredients, materials, fluids, gases, preparations, apparatus, goods, spare parts, comprised in or covered by any specification or inventions in which the company is interested, to carry on the business of advisers, exports, consultants, engineers, metallurgists, technologists, contractors in connection with the cleaning or other treatment of coal or other minerals, etc. Directors: William H. Berrisford, Samuel Berrisford.

Kason Chemical Co., Ltd., 149 Barras Bridge, Newcastle-upon-Tyne.—Registered September 14. Nominal capital £2,000. Manufacturing chemists, druggists, drug grinders, soap boilers, fat and tallow melters and refiners, paint and colour grinders, oil and colourmen, etc. Directors: Edith Watson, Alex. McLaren.

Melbury Perfumery Products Company, Ltd., 31-4 Basinghall Street, E.C.2.—Registered September 4. Capital £100. Objects: To carry on the business of pharmaceutical, manufacturing and general chemists and druggists, manufacturers of and dealers in perfumes and all kinds of toilet requisites, etc. A subscriber: Arthur K. Whitburn.

Midland Oil and Equipment Co., Ltd., St. John's Road, Boston, Lincs.—Registered September 13. Nominal capital £2,000. To acquire the business in the Lincolnshire area carried on by E. W. Pendleton, 11-13 Canal Street, Nottingham, as the "Midland Oil and Equipment Co.," in particular to enter into an agreement with E. W. Pendleton and to carry on the business of manufacturers, producers, distillers and importers of and dealers in oil, lubricants, greases, tallow, petrol, paraffin, benzol, motor spirits, tar bitumen, petroleum, wax, beeswax, fuel oils, etc. Directors: E. De Lannoy Haynes, N. Kirk, and E. W. Pendleton.